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ggtgatacttctcaatcagaagttcaaggcgaagccacactgactgtagacaaatctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgggtctattctgtgcaagagtggtgactatagtaactcttactgactcagctgctggggcac
aggggaccacggtcaccgtctctctgtatcaatccaactctgaagaagcaaaagagagagccaaaaaggaaggaaccaaga
aatctaacacgctgcacattgttctgactcagctccagccaccctgtctgtgactccagagatagagctctcttcttcgacgggcc
5 agccagagatatltagcactacttactactgggtatcaacaaaaatcacatgagctccaaggcttctcaaatatgcttccatccatc
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10 ggtatggctggataaacacccactctggaagtgcacaaatgtagaagacttcaaggacggtttgctctcttggaaacctctgc
caacactgcataattacagataagaacctcaagatgaggacacggctacgtatttctgtgtgagactcgggaatggtaactatga
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ccaccgtcccagcactgnaactcctgggggagctgtcagctctctcttcccccacaaacccaagacacccctcatgactcccg
gaccctgaggtcacatcgctgtggtggagctgagccacgaagaccctgagtgcaagttcaactgtacgtggagcgcgtgga
15 ggtgcataatgccaagacaaagccgctggagggcagctacacagcacgtacgtgtgtgtagcagctcctcacgtctgtgacca
ggctgctgctgaatggcaagggtacaaaggtcgaaggtctcacaacaaagccctccagccccatcgagaaacaaatccaaagc
caaaaggcagccccagagaaccacaggtgtacaccctgccccatcccggtatgagctgaccaagaaccaggtcagcctgact
gctgtgtcaaaagcttctatccacgacatcgcctgtggagtgaggagcaatgggcagccggagaacactcaagaccacg
ctcctccgtgctgactccgacggctcctctctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgct
20 tctatgctccgtgatgcatgaggtctgcacaaactacacgcagaagagcctctcctgtctccgggtaaatgatctaga

2H7-antiCD40 scFv MTH (SSS) MTCH2W1CH3 (2H7-40.2.2201g) (amino acid sequence) (SEQ ID NO: __)

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILASAPGEKVTMTCRASSSVSYMHWY
25 QQKPGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKGSGSGSGSGSGSSQAYLQSQGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWFYFDVWGTGTTVTVSSDQSNSEAK
KEEAKKEEAKKSNSVDIVLTQSPATLSVTPGDRVLSLSCRASQSISDYLHWYQQKSH
30 ESPRLLIKAYASHSISGIPSRFSGSGSGSDFTLSINSVEPEDVGIYYCQHGHSFPWTFGG
GTKLEIKRGGGSGGGSGGGSGGSIQLVQSGPELKKPGETVRISKASGYAFTTTG
MQWVQEMPQGLKLGWGWINTPLWSAKICRRLRQGRFAFSLETSANTAYLQISNLKD

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EDTATYFCVRSNGNGNYDLAYFAYWGQGLTVTVSDQEPKSSDKTHTSPSPAPPELL
GGSSVFLFPKPKDMLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHNAKTK
PREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQPRE
PQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPVLDSD
5 GSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLSPGK

5B9 VH (includes the VH leader peptide) (nucleotide sequence) (SEQ ID NO: __)

atggctgctctgggggctgctctctgctcgggtgacattccaagctgtgtcctatcccagggtgcagctgaagcagtcaggacgtggcc
tagtgcagctctcacagagcctgctccalcactgcacagctctgtgttctcattaaactacctatgctgtacactgggttcgccagctctc
10 caggaaagggtctggagtggtgggtggagtgatgagtggtggaatcacagactataatgcagcttcatatccagactgagcatc
accaaggacgattccaagagccaagtttctttaaaatgaacagctctgcaacctaatgacacagccatttattactgtgccagaaatg
ggggtgataactacccttattactatgctatggactactggggtcaaggaaactcagtcaccgtctccica

5B9 VH (minus the leader) (nucleotide sequence) (SEQ ID NO: __)

15 caggtgcagctgaagcagtcaggacclggcctagtgcagctccacagagcctgtccaicacagctctctggttctcatta
actacctatgctgtacactgggttcgccagctccaggaaagggtctggagtggtctgggagtgatagggagtggtggaatcacaga
ctataatgcagcttcatatccagactgagcatcaccaaggacgattccaagagccaagtttctttaaaatgaacagctctgcaacctta
atgacacagccatttattactgtgccagaaatggggtgataactacccttattactatgctatggactactggggtcaaggaaactca
gtcaccgtctccica

20

5B9 VH (includes leader peptide) (amino acid sequence) (SEQ ID NO: __)

MAVLGLLFLCLVTFPSCVLSQVQLKQSGPGLVQSSQSLSTITCTVSGFSLTTYAVHWV
RQSPGKGLEWLGVISGGITDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDAIY
YCARNGGDNYPPYYAMDYWGQGSVTVSS

25

5B9 VH (no leader peptide) (amino acid sequence) (SEQ ID NO: __)

QVQLKQSGPGLVQSSQSLSTITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVISGGI
TDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDAIYYCARNGGDNYPPYYAMDY
WGQGSVTVSS

30

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5B9 VL (nucleotide sequence) (SEQ ID NO: __)

atgagggtctctgtcagcttctggggctgtgtgctctggatccctggatccactgcagatattgtgatgacgcagggtgcattctc
caatccagtcactcttggaaatcagcttccatctcctgcagggtctagttaaggagctcctacatagtaatggcatcacttaattgtattgg
taictgcgaagccagccagctcctcagctcctgatttatcagatgtccaacctggcctcaggagtcaccagacaggttcagtagca
5 ggggtcaggaaactgattccacatgagaatcagcagagtggaaggctgaggatgtgggtgtttattactgtgtcctaaaatcagaact
tccgtctacgttctgggtctgggaccgaagctggagctgaaacgg

5B9 VL (amino acid sequence) (SEQ ID NO: __)

MRFSAQLLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
10 LYWYLQKPGQSPQLLIYQMSNLAGVDPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKR

5B9 scFv (nucleotide sequence) (SEQ ID NO: __)

aagcttggccgcattgagggtctctgtcagcttctggggctgtgtgtctctggatccctggatccactgcagatattgtgatgacgca
15 ggctgcattctccaatccagtcactcttggaaatcagcttccatctcctgcagggtctagttaaggagctcctacatagtaatggcatca
cttatttgtattgtatctgcagaagccaggccagctctcctcagctcctgatttatcagatgtccaacctggcctcaggagtcaccagaca
ggttcagtagcagtggttcaggaaactgatttcacactgagaatcagcagatggagggtgagatgtgggtgtttattactgtgtc
aaaatcagaactccgctcagcttctgggtgtgtggaccgaagctggagctgaaacgggggtgctgggtggtcggcgggtgtgggt
cgggtgctggcgggctgtcacagggtgcagctgaaagcagtcaggacctggcctagtgcagtcctcacagagcctgtccatcacct
20 gcacagctctctgtttctcttaactacatctgctgtacactgggttcgccagctcctcaggaaaaggcttcggagtggtcggagatgat
atggaagtgtgggaatcacagactataatgcagctttcatalccagactgagcatcaccgaagcagatccaagaaccaagtttcttt
aaaatgaacagctctgcaacctaatgacacagccatttattactgtgccagaatgggggtgataactaccttattactatgctatgga
ctactggggtcaggaaacctcagtcaccgtctcctct

25 5B9 scFv (amino acid sequence) (SEQ ID NO: __)

MRFSAQLLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
LYWYLQKPGQSPQLLIYQMSNLAGVDPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGSGGGSGGGSSQVQLKQSGPLVQSSQSL
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLVGVWSGGITDYNAAFISRLSITKDDSK
30 SQVFFKMNSLQPNDAIYYCARNGGDNPYYYAMDYWGQGTSTVTVSS

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SB9 scFv-hmtfgG1-hCD80 (nucleotide sequence) (SEQ ID NO: __)

aagcttgccggccatgagggtctctgctcagcttctggggctgcttgctctggcatccctggatocactgcagatattgtgatgacga
ggctgcattctccaatcagctactcttggaacatcagcttccatctctcggagctctagaaagctcctacatagtaatggcatca
5 cttattgtattggtatctcgaagaagccaggccagctctcctcagctcctgattatcagatgtccaaacttgccctcaggagctccagaca
ggticagtagcagtgaggcaggaactgatctcacactgagaatcagcagagtgaggctgagagtggtggttattactgtgctc
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cgggctggcgccggatgctcagcagtgagctggaagcagtcaggacctggcctagtgagctcctcagagagcctgtccatcaact
gcacagctctctggtttcattactacatgctgtacactgggttcgcaagctccaggaaaggctgctgagtgctggagtgat
10 atggagtggtggaatcacagactataatgcagctttcatatccagactgagcaccacaaaggacgattccaagagcgaagtttctt
aaaatgaacagctgccaactaatgacacagccatttattactgtgccagaatgggggtgataactaccttattactgctatgga
ctactgggtcaaggacaacctcagtcaccgtctctctgctggaagccaaatctctgacaaaactacacagaagccaccgagcc
cagcacctgaactctctgggggagctgcatgttctcttcccccaaaaccaaaggacacctcatgctcccgaccctgag
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15 gccaaagacaaagccgggggagcagtcacaacagcagctacagctggtgctgacgctcctaccgtctgaccagcagctggct
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agccccgagaaccacaggtgtacaccctgccccatccgggatgagctgaccaagaaccaggctcagctgactgctgctga
aaggcttctatccagcagcagctcgcgtgagtgaggagcaatgggcagccgggaacaactacaagaccacgctccgtg
ctggactccgagggctcttctctctacagcaagctcaccgtggacaagcagaggtggcagcaggggaacgtctctcatgctc
20 cgtgatgcatgaggtctgctgcacaaccactacacgacagaaagagcctctccctgctcctgggtaagcggatcttcgaacctgctcc
catctggggcattaccttaatctcagtaaatggaattttgtgatatgctgcctgacctactgcttgcaccaagatgcagagagaga
aggaggaatgagagattgagaagggaaggtgacgacctgtataaactgatactcag

SB9 scFv-hmtfgG1-hCD80 (amino acid sequence) (SEQ ID NO: __)

MRFSAQLLLVWIPGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
LYWYLQKPGQSPQLLIYQMSNLAGVPDRFSSSGSGTDFTLRISRVEAEDVGYYCY
AQNLELPLTFGAGTKLELKRGGGSGGGGGSSQVQLKQSGPLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLVGIWSSGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDAIYYCARNGGDNPYYYAMDYWGQGTSTVTVSSDLEPKSS
25 DKTHTSPSPAPELLGGSSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNW
YVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPA
PIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP

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ENNYKTTPVLSDSGSFFLYSKLTVDKSRWQQGNVFSVMEALHNHYQKSL
LSPGKADPSNLLPSWAITLISVNGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

2e12 scFv WTH CH2 CH3 (2e12 scFv-WthIgG-CD80) (nucleotide sequence) (SEQ

5 ID NO:)

aaagctatggatttcaagtcgacatttcagcttctgctaatcagtgctcagtcataatgtccagagagagtcgacattgtctcacc
aatctccagcttcttggctgtctctaggtcagagagccacatctctgcagagccagtggaagtgtgtaataatgatgcacaagtt
taatgcagtggtaccacagaacacagagacacccaaactctcatctctgctgcatccaagtagaattctgggtccctgcc
agggttagtgagcagtggtctgggacagactcagcctcaacatccatctgtggaggagatgataatgcaatttctgtcagc
10 aaagtaggaaggttcttggacgttcgggtggagcccaagctggaaatcaaacgggtggcgtggtcgtggcggaggtggg
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15 actgggtcgaaggaaacctcagtcaccgtctctcagatctggagcccaaaactgtgacaaactcacatgcaccaccgtgccca
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20 cccgagaaccacaggtgtacacccctgcccccacccgggagtgagctgaccagaaccaggtcagcctgacctgctctgggtcaaa
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atcctggggcattacattaatctcagtaaatggaatttctgtatagctgcctgacctactgcttgcgcccaagatgacagagagaga
25 ggaaggaatgagagattgagaagggaaggtgacgccctgtataatcgat

2e12 scFv WTH CH2 CH3 (2e12 scFv-WthIgG-CD80) (amino acid sequence) (SEQ

ID NO:)

MDFQVQIFSLLISASVIMSRGVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
30 LMQWYQQKPGQPPKLLISAASNVESGVPARFSGSGSGTDFSLNIHPVEEDDIAMFY
CQQSRKVPWTFGGGKLEIKRGGGGSGGGSGGGGSGVQLKESGPGLVAPSQSL
ITCTVSGFSLTGYGVNWNVRQPPGKLEWLGMTWGDGSTDYNSALKSRLSITKDNS

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KSQVFLKMNSLQTTDARYYCARDGYSNFHYVMDYWGQGSVTVSSDLEPKS
CDKTHTCPPCPAPELLGGPSVFLPPPKPKDTLMISRTEVTCVVVDVSHEDPEVKFN
WYVDGVEVHNAKTKPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALP
APIEKTISKAKGQPREPVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQ
5 PENNYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNYHTQKSL
SLSPGKADPSNLLPSWAITLISVNGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

2H7-human IgE Fc (CH2-CH3-CH4) (nucleotide sequence) (SEQ ID NO: __)

aagcttgcgcgcatttgcaatgcagatttcagcttctcgtcaatcagtgcttcagtcataattgccagaggacaaattgtctct
10 cccagctccagcaatcctgtctcgtcctccaggaggagaaagtcacaaagacttcagagggccagctcaagtgtaagtacatgcact
ggtaaccagcagaagccaggaatctcccccacccctggattatgcccatcacaactggctctcgtgagtgctctgctcgttcagtg
cagctgggtctcgggacccttactctctcacaacagcagagtgagggtgaagatgctgcacatttactgcagcagtgaggattt
taaccacccacgttcgtctcgggaccacagctggagctgaaaggtggcgtgctcggcggtgctgagtgctgagtgaggaggtg
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15 tacacatttacagttacaatatgcaactgggttaaagcagacacctagacaggcctggaatggagtggagctattatccaggaaat
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cagcctgacacttgaaagactctgcgtctatttctgtgcaagagtggtgtactatagtaacitctactggtactctgctctggggcac
agggaccacgggtaccgtctctgaltcagctgtcctccagggaactcaccggccacagctgaagattctacagctgctctgcagc
gctggcggtcacttccccgaccatccagctcctgtgctcgtctcgttggtacacccagggaactatcaacatcactggctgga
20 ggacggcgaggtcatgagcagtgactgtccaccgctctaccacgcaggagggtagtgctgcctccacacaaagcgagctca
ccctcagccagaagcactggctgtcagaccgacactacacctgccaggtcactatcaaggtcacaccttgtagacagaccacaa
gaagtgtagcagattccaaccgagagggggtgagcgctacctaaggccggccagccggtcagctgttcatccgaagtgcgc
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25 ggaatcagggggagagactaccagtcaggggtgaccacccccacctgccagggccctatgctggtccagaccaaagaccag
cgcccgccgtgctgccccggaagtctatgctttgcagccggagtgccggggagccggggagacaaagcgcacctcgcctgc
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acgacgccccgcaagaccagggtccggctctcgtctcagccgctgagagtgaccaggccgaalggggcagcaagaaga
tgagtatctgctgctgagctccatgagcagcagagccctcacagaccgtccagcagcgtgtctgtaaatccggtaantgat
30 aatcaga

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2H7 scFv MH (SSS) MCH2WTCH3 (amino acid sequence) (SEQ ID NO: __)

MDFQVQIFSLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSVSVMHWY
 QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
 5 FNPPTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
 ASGYFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
 TAYMQLSSLTSEDSA VYFCARVYYNSNYWYFDVWGTGTTTVSSDQEPKSSDK
 THTSPSPAPELLGGSSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
 DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYCKVSNKALPAPIE
 10 KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
 NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLS
 PGK

5B9 scFv MTHWTCH2CH3 (nucleotide sequence) (SEQ ID NO: __)

15 aagcttgcgccatgagggtctctgctcagctctgggctgcttgctcctggatccctggatccactgcagatattgtgagacgca
 ggctgcatctccaatccagtcactcttgaacatcagctccatctcctgcaggctctagtaagagctcctcatagtaaatggcatca
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 ggctcagtagcagtggtgcaggaaactgatttcacactgagaatcagcagagtgaggctgaggaatgtgggtgtttattactgtgctc
 aaatctagaactcgcctcagcttgcgtgctgggaccaagctggagctgaaacgggtggcggtgctcggcggtgtgtgggt
 20 cgggtggcgccgcatgclacaggtgcagctgaagcagtcaggacctgcctagtgagctcctcacagagcctgtccatcaact
 gcacagctctctgtttctcattactaactatgctgtacactgggttcgccagctcctcaggaagggctctgagtggtgggagtgat
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 ctactggggtcaaggaaactcagtcaccgtctcctctgatcaggagcccaatctctgacaaaactcacacatccccaccgtcccc
 25 agcacctgaaactcctggggggaccgtcagcttctctctcccccaaaacccaaggacacctcatgatctccggagccctgag
 gtcacatcgctgtgtgtggcgtgagccacgaagacctgaggtcaagttcaactgtacgtggagggcgtggaggtgcataat
 gccaaagcaaaagccggggagagcagctacaacagcagctaccgtgtgtgcagcgtcctcaccgtcctgcaccaggagctggt
 gaalggcaaggagtaacaagtgaaggctctccaacaaagccctccagcccccacaggaanaacatccaaagccaaagggc
 agccccgagaaccacaggtgtacacctgccccatccgggatgagctgaccaagaaccaggtgacgtgacctgctgtgca
 30 aagcttctatcccagacatcgcctggagtgaggagcaatgggcagccggagaaacactacaagaccacgctcctgtg
 ctggactccagggctcctctctctctacagcaagctaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctc
 cgtgagcatgaggctctgcacaaccactacagcagaagacctctcctgtctcctgggtaaatgactaga

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5B9 scFv MTHWTC2CH3 (amino acid sequence) (SEQ ID NO: __)

MRFSAQLLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLHSNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVDPDRFSSSGSGTDFTLRISRVEAEDVGVVYYC
5 AQNLELPLTFGAGTKLELKRGGGSGGGSGGGSSQVQLKQSGPGLVQSSQSL
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWVSGGTDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDAIYYCARNGGDNYPIYYAMDYWGQGTSTVTVSSDQEPKSS
DKTHTSPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNW
YVDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYCKCKVSNKALPA
10 PIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP
ENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFVMSHHEALHNHYTQKSLS
LSPGK

Human IgG1 hinge mutations

2H7 scFv- MTH (CSS) WTC2CH3 (nucleotide sequence) (SEQ ID NO: __)

15 aagcttgccgccatggatttcaagtcgagatttcagcttcctgctaatacagtgcttcagtcataaagccagagagacaattgtctct
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ggtaccagcagaagccagatcctccccaacccctggatttatgcccatccaacccctgctctgagtgctcctgctcgttcagtg
gcagtggtgcttggaacctctactctctcacaatcagcagagtggtgagctgaagatgctgccacttattactgccagcagtgaggtt
20 taaccacccacgttcgtgctgagaccagctgagctgaaagatggcggtgctcggcggtgctgagctgagagagtg
ggagctctcaggttactacagcagctctgggctgagctggtgagccctgggctcagtgagatgctcgaagctctctggc
tacacattaccagttacaatgactcgggtaagcagacacctagacagggcctggaatggatggagctattatcaggaat
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cagcctgacatctgaagactctgcgcttattctgtgcaagagtggtgtactatagtaactctactgctactcgtctgggcac
25 agggaccacgttcacgtctctctgatcagagcccaaatctgtgacaaaactcacacatcccaccgtccccagacctgaac
tctctggggggaccgtcagcttctctctcccccaaaacccaaggacacctcatgatctccgggacctgaggtcacatcgctg
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ccgcggggagagcagtaacaacagcagctaccgtgtgtgacgctcctaccgtctgcaccagcagctgctgaatggcaagga
gtacaagtgcaaggtctccaacaagccctccagcccccagagaaaactctcaagccaaaggcgagccccgagAAC
30 cacaaggtgtacacctgccccatccgggatgagctgaccaagaacagtgacgctgacctgctgtgcaaggtctctatcc
cagcgacatcgcctggagtgagagcaatgggcagccggagagaacactacaagaccacgcctcccgctgctgactccgac

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ggctctcttctctacagcaagctcaccgtggacaagagcagggtggcagcaggggaacgtcttctcatgctccgtgatgcalga
ggctctgcacaaacctacacgcagaagagcctctcctgtctccgggtaaatgatctaga

2H7 scFv- MTH (CSS) WTCH2CH3 (amino acid sequence) (SEQ ID NO: __)

5 MDVQVQIFSLILISASVIIARGQIVLSQSPAILASAPGEKVTMTCCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPTFTGAGTKLELKDGGGSGGGGSGGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDASVYFCARVVYYNSNYWYFDVWGTGTTVTVTSSDQEPKSCDK
10 THTSPSPAPELLGGPSVFLFPPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVENAKTKPREQYNSTYRVVSVLTVLHQDWLNGKEYCKCKVSNKALPAPIE
KTISKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSFSVMHEALHNHYTKQKSLSL
PGK

15

2H7 scFv- MTH (SCS) WTCH2CH3 (nucleotide sequence) (SEQ ID NO: __)

aagcctgccgccatggatttcaagtcagatttcagcttctgctaatacagtgcttcagtcataaattgccagaggacaantgtctct
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ggfaccagcagaagccagatctccccaaacctggatttatgcccatccaacctgctcttgagctcctgtctcgttcagtg
20 gcagtggtgtctggacctcttactcttcacaatcagcagagtgaggctgaagatgctgcaccttattactgccagcagtgaggttt
taaccarccacgttcggtctgggaccagctggagctgaagatggcgtgtgctcggcggttggtggtctggaggaggtg
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25 cagcctgacatctgaagactctgcggtcttactgtgcaagagtggtgtactatagtaacttactgtgtaacttgatgtctgggacac
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30 gtacaaggtcaaggctccacaagaagccctccagccccatcagagaaaacatctcaaaagccaagggcagccccgagaac
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- 20
 25
 30
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 cagcctgacatctgaagactcgcgctctatttctgcaagag tgggtgactatagtaactcttactggtactcgtatctgtgggcac
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 gtcaaa gttcaaggtctccaaacaaagccctccagccccatc gagaaaaactctccaaaagccaaaggcagcccccagagaa

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cacagggtgtacacctgcccccacccgggagtgagctgaccaagaaccagggtcagcctgacctgcctggtcaaggcctctatcc
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ggctcctctctctacagcaagctcaccgtggacaagagcagggtggcagcagggaacgctctctcatgctccggtgatgcatga
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5

2H7 seFv- MTH (SSC) WTCH2CH3 (amino acid sequence) (SEQ ID NO: __)

MDFQVQIFSLLISASVIIARGQIVLSQSPAILSPGKVTMTCRASSSVSYMHWY
QKQPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
10 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSYWFYFDVWGTTVTVSSDQEPKSSDK
THTSPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVYVDVSHEDPEVKFNWY
VDGVEVHNAAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
15 NNYKTTTPVLDSGDFLYSKLTVDKSRWQQGNVSCSYMHEALHNHYTQKSLSL
SPGK

HlgGMHcys1 (nucleotide sequence) (SEQ ID NO: __)

gtt gtt gat cag gag ccc aaa tct tct gac aaa act cac aca tg

20

HlgGMHcys2 (nucleotide sequence) (SEQ ID NO: __)

gtt gtt gat cag gag ccc aaa tct tgt gac aaa act cac aca tct cca cgg tgc

HlgGMHcys3 (nucleotide sequence) (SEQ ID NO: __)

25 gtt gtt gat cag gag ccc aaa tct tgt gac aaa act cac aca tct cca cgg tcc cca gca cct

HuIgG1 MTCH3Y405 (nucleotide sequence) (SEQ ID NO: __)

gggcagcccccagaaaccagggtgtacacctgcccccacccgggaggagatgaccaagaaccagggtcagcctgacctgcct
ggtcaaggcctctatccagcgacatcgccgtggagtgaggagcaatgggcagccggagacaactacaagaccacgcctc

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ccggtgctgactccgacggctcctctacctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctcttc
atgctccgtgatgatgaggtctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

HuIgG1 MTCH3Y405 (amino acid sequence) (SEQ ID NO: __)

- 5 GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTP
VLDSDSGSFYLSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

HuIgG1 MTCH3A405 (nucleotide sequence) (SEQ ID NO: __)

- gggcagccccgagaaccacaggtgtacacctgcccccattccgggagagatgaccaagaaccaggctcagcctgacctgcct
10 ggtcaaaaggctctatccacgcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcctc
ccgtgctggactccgacggctcctctccctctatagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctcttc
atgctccgtgatgatgaggtctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

HuIgG1 MTCH3A405 (amino acid sequence) (SEQ ID NO: __)

- 15 GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTP
VLDSDSGSFALYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

HuIgG1 MTCH3A407 (nucleotide sequence) (SEQ ID NO: __)

- Gggcagccccgagaaccacaggtgtacacctgcccccattccgggagagatgaccaagaaccaggctcagcctgacctgcc
20 tggcaaaaggctctatccacgcgacatcgccgtggagtgggagagcaatgggcagccggagaacaactacaagaccacgcct
ccgtgctgactccgacggctcctctctctccgccaagctcaccgtggacaagagcagtggtgcagcaggggaacgtctcttc
catgctccgtgatgatgaggtctctgcacaaccactacacgcagaagagcctctccctgtccccgggtaaatga

HuIgG1 MTCH3A407 (amino acid sequence) (SEQ ID NO: __)

- 25 GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTP
VLDSDSGSFFLASKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLSPGK

HuIgG1 MTCH3Y405A407 (nucleotide sequence) (SEQ ID NO: __)

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gggcagccccgagaaccacaggtgtacacctgccccatccccggaggagatgaccaagaaccaggtcagcctgacctgctt
ggtcaaaaggcttctatccagcgacatcgccgtggagtgaggagagcaatgggagccggagaaactacaagaccacgcctc
ccgtgctgactccgacggctccttctacctgccagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctc
atgctccgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctgtccccgggtaaatga

5

HuIgG1 MTCH3Y405A407 (amino acid sequence) (SEQ ID NO: __)

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
VLDSGDGFSYLASKLTVDKSRWQQGNVFCSCVMIEALHNIHYTKSLSLSPGK

10 **HuIgG1 MTCH3A405A407 (nucleotide sequence) (SEQ ID NO: __)**

gggcagccccgagaaccacaggtgtacacctgccccatccccggaggagatgaccaagaaccaggtcagcctgacctgctt
ggtcaaaaggcttctatccagcgacatcgccgtggagtgaggagagcaatgggagccggagaaactacaagaccacgcctc
ccgtgctgactccgacggctccttgcctcgccagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctc
catgtccgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctgtccccgggtaaatga

15

HuIgG1 MTCH3A405A407 (amino acid sequence) (SEQ ID NO: __)

GQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
VLDSGDGSFALASKLTVDKSRWQQGNVFCSCVMIEALHNIHYTKSLSLSPGK

20 **2H7 scFv MTH (SSS) WTCH2MTCH3Y405 (nucleotide sequence) (SEQ ID NO: __)**

aagcttgcccgatggatttcaagtcagatgtttagcttctgtaatacagtgcttcatgataattgacagagcaaatgttctt
cccatgctccagcaatcctgctgcatctccaggggagaaaggticacaatgacttgcaggccagctcaagtgttaattacatgcact
ggtaccagcagaangccagatctcccccaaacctggatttatgcccatccaacctggcttctgagtgcttccctgctcgttcagtg
gcagtggtgcttggacccttactctctcacaatcagcagagtgtaggctgaagatgctgccatttatctccagcagtgaggattt
25 taaccaccaccaggttcgtgtcgggaccaagctggagctgaaagatggcgggtgctcggcggtgtggtatcggaggaggtg
ggagcttcaggttatctacagcagctgtgggtgagctgtgagcctggggcctcagtggaatgtcctgcaaggcttctggc
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cagcctgacatctgaagactctgcgtctatttctgtgcaagagtggtgtactatagtaactcttacttggtacttcgatgtctggggcac
30 agggaccaccggtaccgtctctctgatcaggagcccaaatcttgacaaaactcacacatccccaccgtccccagcacctgaaac

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tcttggggggagcgtcagcttctcttccccccaaaacccaagacacctcatgatctccggacctcctgaggtcacatgcgtg
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5 cacaggtgtacaccccgccccatccgggaggagatgaccaagaacaggtcagcctgacctgctgctcaaggctctatcc
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ggctctcttctacatctatagcaagctcaccgtggacaagagcaggtggcagcaggaggaaactctctcatgctccgtgatgatga
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- 10 **2H7 scFv MTH (SSS) WTCH2MTCH3Y405 (amino acid sequence) (SEQ ID NO: __)**
MDFQVQIFSLFLISASVIIARGQIVLSQSPAILASAPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSQAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
15 TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTVSSDQEPKSSDK
THTSPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVEVHNATKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKKTTPPVLDSDGSFYL SKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSLS
20 PGK

- 2H7 scFv MTH (SSS) WTCH2MTCH3A405 (nucleotide sequence) (SEQ ID NO: __)**
aagcttgccgccattggaatttcaagtcgaatttcagctctgctaatcagtgcttcagtcataaattgccagaggacaaattgtctct
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25 ggtaccagcagaaggccaggaatctcccccaaacctggatttatgcccaatccaaacctggcttcaggagctccgtcgtcgttcagtg
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tacacattaccagttacaatagcactgggttaaagcagacacctaagacggcctgggaatggattggagctattatccaggaat
30 ggtgatactctcacaatcagaagttcaaggcgaaggccacactgactgtagacaatactccagcagacgctacatgcagctcag
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ccggcgagggagcagctacaacagcacgtaccgtgtggtcagcgtcctcaccgtcctgcaccaggactggctgaatggcaaggga
5 gtaacaagtgcagggtctccaacaaagccctccagccccatcagagaaaacaatctccaagccaaaggcgagcccgagagaac
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cagcgacatcgccgtggagtgaggagcaatggcgagccggagaaactacaagaccgcctcccggtgctgacatccgac
ggctccttcgccctctatagcaagctcaccgtggacaagagcaggtggcagcagggaacgtcttctcatgctccgtgatgatga
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10

2H7 scFv MTH (SSS) WTCH2MTCH3A405 (nucleotide sequence) (SEQ ID NO: __)

mdfqvqifslisasviiaqgqvlsqspailsaspgkvtmtcrassvsymhwyqkpgsspkpwiypsnlasgvparf
sgsgsgtsysltirveaedaatyycqgwsfnptfgagtklelkdgsgsgsgsgsgssqaylqsgaelvrpgasvkmnc
kasgtytfsynmhvwktpqrqglewigaiypngdtsynqkfkgaatlvdksstaymqslsitsedsavfcarvvyvsn
15 sywyfdvwtggtvttvssdqepkssdkthtspspapellggpsvflfpkpkdltmisrpevticvvvdshdedpevkfnw
yvdgvevhnaktfpreeqymstyrvsvltvlhqdwlngkeykckvsnkalpapiektiskakgqprepvytlppsreemt
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slspgk

2H7 scFv MTH (SSS) WTCH2MTCH3A407 (nucleotide sequence) (SEQ ID NO: __)

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25 taaccacccacagttcggtgctgggaccaagctggagctgaagaatggcgtgctgctcggcggtggtggtatctggaggaggtg
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cacaggtgtacacccctgccccatccggaggagatgaccaagaaccaggtcagccctgacctgctgtcaaaggcttctatcc
5 cagcgacatcgccgtggagtgaggagcaatgggcagccggagagaacaactacaagaccagcctccctgctgtggactccgac
ggctcctctctcctccagcaagctcaccgtggacnaagcaggtggcagcggggaacgtctctcatgctcgtgatgcatga
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2H7 scFv MTH (SSS) WTCH2MTCH3A407 (amino acid sequence) (SEQ ID NO: __)

10 MDFQVQIFSFLISASVIIARGQIVLSQSPAILASPGKEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWIIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
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15 THTSPSPAPELLGGPVSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DQVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPPVLDSDGSFFLASKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKSLSLS
PGK

20

2H7 scFv MTH (SSS) WTCH2MTCH3Y405A407 (nucleotide sequence) (SEQ ID NO: __)

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25 ggtaccagcagaagccaggaatcctcccccacccctggalltatgccccaccaaactggcttcgagtgacctgctcgtcgttcagtg
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10

2H7 scFv MTH (SSS) WTCH2MTCH3Y405A407 (amino acid sequence) (SEQ ID NO:)

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15 FNPPTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
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20 KTISKAKGQPREPQVYTLPPSREEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
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2H7 scFv MTH (SSS) WTCH2MTCH3A405A407 (nucleotide sequence) (SEQ ID

25 NO:)

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 30

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tacacattaccagttacaatagcactgggtaagcagacacctagacaggccctggaatggatggagctattatccagaaat
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2H7 scFv MTH (SSS) WTCH2MTCH3A405A407 (amino acid sequence) (SEQ ID

15 **NO: 1)**
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 20 TAYMQLSSLTSEDSAVYFCARVYYNSYWFYFDVWGTGTTVTVSSDQEPKSSDK
 THTSPSPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
 DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
 KTISKAKGQPREPQVYTLPPSRBEMTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
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 25 PGK

2H7 scFv MTH (SCC) WTCH2CH3 (nucleotide sequence)

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 30 ggtaccagcagaagccagatctcccccaaacctggatttatgcccatccaacctgctcttggagctccctgctcgtctcagtg
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15

2H7 scFv MTH (SCC) WTCH2CH3 (amino acid sequence)

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20 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVVYYSNSYWFVDVWGTTTIVTSSDQEPKSSDK
THTCPPCPAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWY
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EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
25 NNYKTTTPVLDSGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSL
SPGK

2H7 scFv MTH (CSC) WTCH2CH3 (nucleotide sequence)

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2H7 scFv MTH (CSC) WTCH2CH3 (amino acid sequence):

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20 FNPTTFGAGTKLELKDGGSGGGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
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TAYMQLSSLTSEDSAVYFCARVVYYSNSYWFYFDVWGTGTTVTVSSDQEPKSCDK
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25 EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
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SPGK

2H7 scFv MTH (CSC) WTCH2CH3 (nucleotide sequence)

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30 cccagctccagcaatctctgctcatctccaggggagaaagtcacaatgacttgaggccagctcaagtgtaagtacatgcact

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15 ggtctctctctctacagcaagctcaccgtggacaagcaggtggcagcaggggaacgtctctcatgctccgtgatgcatga
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2H7 scFv MTH (CCS) WTCH2CH3 (amino acid sequence)

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSVSVMHWY
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25 VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
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NNYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSSVMHEALHNHYTQKSLSL
SPGK

30 **HuIgAHlgA-T4-ORF (nucleotide sequence)**

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10 ac

HuIgAHlgA-T4-ORF (amino acid sequence)

DQVPVSTPTPTSPSTPTPTSPSCCHPRLSLRPALEDLLGSEAILTCTLTGLRDSGV
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15 PLTATLSKSGNTRFRPEVHLLPPPSEELALNELVLTCLARGFSPKDVLRVRLQGSQ
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1D8-IgAH IgA-T4-CD80 (nucleotide sequence)

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30 ccgaccggccctcgaggacctgctcttaggttcaagaagcgaatctcacgtgcacactgaccggcctgagagatgcctcaggtgtc
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AA

10 **ID8 scFv IgAH IgA-T4-CD80 (amino acid sequence)**

MDFQVQIFSFLLISASVIMSRGVDIVLTQSPTTIAASPGKEVTTTCRASSSVSYMYWY
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SSTPLTFSGTGKLEIKRGGGGSGGGSGGGSGVQLKEAGPGLVQPTQLSLTCTV
SGFSLTSDGVHWIRQPPGKGLEWMGIYYDGGIDYNSAIKSRLSISRDTSKSQVFLK
15 INSLQTDDTAMYYCARIHFDYWGQGVMTVSSDQVPSPPTPTSPSTPPTPSPSCC
HPRLSLHRPALEDLLLGSAILTCLTFLGRDASGVTFWTWPSSGKSAVQGPDRDL
CGCYSVSSVLPGAEPWNHGTKFTCTAAYPESKTPLTATLSKSGNTFRPEVHLLPP
PSEELALNELVTLTCLARGFSKPDVLRWLQGSQELPREKYLWASRQEPSQGT
FAVTSILRVAEDWKKGDTFSCMVGHEALPLAFTQKTIDRLAGKPTHVNVSVVM
20 AEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRRRRNRRLRRESVRPV

human IgE Fc (CH2-CH3-CH4) ORF (nucleotide sequence)

tgatcacgtctgtctccagggaacttaccgccaccgtggaagatttaccagtcgtctgctgcgacggcgccggcggaacttccccg
accatccagctcctgtgctcgtgtctgtgggtacacccagggaactatcaatcacctgctgctggagggacggcgatcaggacg
25 tggactgtgccaccgctctaccacgacgaggggtgagctggctccacacanaagcgagctaccctcagccagaagacatggc
tgtcagaccgcacctacacgtccaggtcacctatcaaggtcacaccttgaaggacacacaaagatgtgcaattccaacc
gagaggggtgagcgectactaagccggccaccgccgttcgacctgttcacccgaagtcgccacgatcctgtctggtgtg
gacctggcaccacgacgaaggacgtgaacctgacctgtccggccagtgaggagcctgtgaaccactcaccagaaagg
aggagaagcagcgcaatggcaggtlaacctgcacgtccacctgcccgtggcgacccgagactggatcagggggagaccta
30 ccagtgacgggtgaccacccccacctgccaggccctcatgcgtgccacgaccaagaccagcggcccgctgctgccccg
gaagtctatgcgtttgcgacgccgagtgccggggagccgggacaaagccacccctgctgctgctacacgaactcatgct

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AA

DHVCSRDFTPPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDV
 DLSTASTTQEGELASTQSELTLSQKHWSLDRTYTCTQVTYQGHTFEDSTKKCADSN
 PRGVSAYLSRSPFDLFIKSPITITCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKE
 EKQRNGTLTVTSTLPVGTRDWIEGETYQCRVTHPHLPALMRSTTKTSGPRAAPE
 10 VYAFATPEWPGSRDKRTLACLIQNFMPEIDISVQWLHNEVQLPDARHSTTQPRKTK
 GSGFFVFSRLEVTRAWEOKDEFICRAVHEAASPSOTVORAVSVNPGKADPS

[illegible]

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atctgggtgcagtggtctgcacaaagggtgcagctcccggagcccccggcacagcacgacgagccccgaagaccaagggct
ccggctctctcgtcttcacgccgcctggagggtgaccaggccgaatgggagcagaagatgagttcatctgccgtgcagtcctatga
ggcagcggagccctcagacaccgtccagcgagcgggtgctgtaaatcccgtaaagcggatccttcgaagctcccatctcgggc
cattacctaatctcagtaaatggaatttttgatgctgctgacctactgctttgcccccaagatgcagagagagaaggaggaatg
5 agagattgagaagggaagggtgtacgcccctgtataaatcgata

1D8-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)

MDFQVQIFSLFLISASVMSRGVDIVLTQSPTTIAASPGKEVITICRASSSVSYMYWY
QQKSGASPKLWIYDTSKLGASGVPNRFSGSGSGTSYSLAINTMETEDAATYYCQQW
10 SSTPLTFGSGTKLEIKRGGGSGGGGSGGGGSGVQLKELAGPLVQPTQTLSLTCTV
SGFSLTSDGVHWIRQPPGKGLEWMGIIYDGGTDYNSAIKSRLSISRDTSKSQVFLK
INSLQTDITAMYYCARIHFDYWGQGVMTVTVSSDHVCSRDFPTPVKILQSSCDGG
GHFPPTIQLLCLVSGYTPGTINITWLEDQVMDVDLSTASTTQEGELASTQSELTLS
QKHWLSDRITYTCQVITYQGHTFEDSTKKCADSNPRGVSAYLSRSPFDFLRKSPITI
15 TCLVVDLAPSKGTVNLTWSRASGKPVNHSTRKEEKQRNGJLTVTSTLPVGTDRDWI
EGETYQCRVITHPLPRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLI
QNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFSRLEVTRAWEQKDE
FICRAVHEAASPQTQRAVSVNPGKADPSKLPFWAITLISVNGIFVICCLTYCFAP
RCRERRRRNERLRRESVRPV

20

5B9-IgAII IgA-T4-CD80 (nucleotide sequence)

aagcttgccgccatgaggttctctgctcagctctggggctgcttgctcggatccctggaaccactgcagatattgtgatgacga
ggctcgcaattccatccaggcactcttggaacatcagctccatctcctgcagctctagtaagagctcctacatagtaatggcatca
cttattgtattgtaictgcagaagccaggccagctcctcctcagctcctgatttatcagatgtccaaacctgcctcaggagtcaccagaca
25 ggttcagtagcagtgggcagggaactgatttcacactgagaatcagcagagtgaggagctgaggatgtgggtttattactgtgctc
aaaatctagaactccgctcagcttcggtgctgggaccaagctggagctgaaacggggctggcgtggctcggcggtggtgggt
cgggtggcgccggatgctcagagtgagcgtgaagcagtcaggacctggcctagtgcagctccacagagcctgtccatcacct
gcacagctctctggtttctcatfaactacctatgctgtacactgggttcgccagctccaggaaagggtctggagtgctgggagtgat
atggagtggtgggaatcacagactataatgcagcttccatccagactgagcatcaccagaagacgattccaagagccaagttttctt
30 aaaatgaacagctgccaacctatgacacagccatttattactgtgccagaatgggggtgataacctaccttattactatgetatgga
ctactgggtcaagggaacctcagtcaccgtctcctctgatacaggcagttccctcaactccactacccatctccctcaactccact

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accccattccctcagctgccacccccgactgtcactgcaccgaccgcccctcagagacctgcctttagctcagaagcgatcct
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ccacctgaccgtgacctctgtggctgtctacagcgtgtccagtgctctgccgggctgtgccgagccatggaacctatgggaagacctt
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5 cactctgtgccgccgccctcgaggagctggtccctgaacgagctggtgacgctgactgctgacgctggtctcagcagcttgcagcccaa
ggatgtgctggttcgtgctgtcagggtgcacaggagctgccccgcgagaagtactgacttgggcatccggcgagagccca
ggcaggcgaccaccaccttcgtgtgaccagcactgctgcgtggcagccgaggactggaagaagggggacaccttctctgtc
atggtgggcgcaggagccctgccgtggccttcacacagaagaccatcgaccgcttgccgggtaaacccaccatgtaaatgtgt
ctgttgcatgscggaggtggagcggatccttcgaacaacctgctccatcctgggcatcttaactcagtaaatggaaatgtt
10 gtgatgctgcctgacctactgcttggcccaagatgcagagagaaggaagggaatgagagatgagaagggaagtgtacgcc
ctgtataaatcgatac

5B9-IgAH IgA-T4-CD80 (amino acid sequence)

MRFSAQLGLLVLPWGSTADIVMTQAAFSNPVLTGTSASISCRSSKSLHNSGITY
15 LYWYLQKPGQSPQLLIYQMSNLASGVPRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGGSGGGSGGGSSQVQLKQSGPGLVQSSQSLS
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVWSGGITDYNAAFISRLSITKDDSK
SQVFFKMNSLQPNDAIYYCARNGGDNPYYYYAMDYWGQTSVTVSSDQVPVST
PPTPSPSTPPTPSPSCCHPRLSLHRPALEDLLGSEAILTCTLTGLRDASGVITFTWTPS
20 SGKSAVQGGPPDRDLGCYSVSSVLPGCAEPWNHGKTFCTCTAAYPESKTPLTATLS
KSGNTFRPEVHLLPPSEELALNELVTLTCLARGFSPKDVLRWLQSGQELPREKY
LTWASRQEPSQGTTTFAVTSILRVAEDWKGDTFSCMVGHEALPLAFTQKTIDR
LAGKPTHVNVSVVMAEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRER
RRNERLRRESVRPV

25

5B9-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)

aagcttgcgcccatgagggttctctgctcagcttctgggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggtcgtcatctccaatcagtcactcttggaacatcagcttccatctctgcaggtctagtaagagctctccatagtaagtgcacatca
cttattgtatgtgatctgcagaagccaggccagctctccctcagctctgattatcagatgccaaacctgctcaggagatccagacaa
30 ggttcagtagcagtggtcaggaaactgattcacactgagaatcagcagagtgaggctgagagatgtgggtgttattactgtgtc
aaaactcagaactccgctcagcttggctgtgggaccaagctggagctgaaacgggggtggcgggtggctcggcggtggtggt

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- cggggtggcggcggatgcacagctgcacgtgaagcagtcaggacctggcctagtcagctccacagagcctgtccatcacct
gcacagctctctgtttctcatatcaactacatgctgtacactgggttcgccagtcaccagaaagggctcggagtgctggagtgat
atggagtggtggaaacacagactataatgacagctttcatatccagactgagcatcaccaaggacatccaagagccaaagtctt
aaatgaacagctctgcaacctaataacacagccatttactgtgccagaaatgggggtgataactcccttattactatgctatgga
5 ctactggggtaaggaaacctcagtcaccgtctctctgtatcacgtctgctccagggacttcccccggccacgtgaagatcttaca
gtcgtctgcgcagcggcggcggcacttccccccgacctcagctcctgtgcctcgtctctgggtacacccaggagctatcaac
atcacctggctggaggacggcaggtctgacgtggactgtccaccgctctaccacgacggagggtgagctggcctcaca
caaaagcagctcacctcagccagaagcactggctgtcagaccgacctacacctgccaggtcacctatcaaggctcacaccttg
aggacagcaccaagaagtgtgacagattccaaccgagagggggtgagcgcctacctaagccggccagccgttcgacctgttca
10 tccgaagtcgccacatcacctgtctgtgtggactggcacccagcaaggggaccgtgaacctgacctgtgtccggccca
gtgggaagcctgtgaaccactccaccaaaaaggaggagaagcagcgcaatggcacgttaaccgtcacgtccacctgccggtg
ggcaccggagactgcatcaggggggagctaccagtgacgggtgacccaccccacctgccaggggccctcatgctgtcca
cgaccaagaccagcggcccgcgtgctgccccggaagtctatcggttgacgcccggagtggccggggagccgggacaaac
gcacctcgctgctgatccagaactcatgctgaggacatctcgtgagtggtgcacacgagggtgacagctccggagcc
15 ccggcacagcagcagcagcagccccgcaagaccaagggtctccgctcttcgtcttcagccgctggaggtgacagcggccgaat
gggagcagaagaatgagttcatctcgtgacgtccatgaggcagcgagccctcacagaccgtccagcagcgggtgtctgtaa
atcccggtaaaagcggatcctcgaagctccatcctggccattacccttaatctcagtaaatgtgaaattttgatatgtgctgacct
actgctttcccccaagatgcagagagagaaggaggaatgagagattgagaagggaaggtgacgccctgtataatcgata
- 20 **5B9-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)**
MRFSAQQLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDFRSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGSGGGGSGGGGSSQVQLKQSGPGLVQSSQSL
ITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSK
25 SQVFFKMNSLQPNDAIYYCARNGGDNYPIYYAMDYWGQGTSTVTVSSDHHVCSR
DFTPTPVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINTWLEDGQVMDVDLSTAS
TTQEGELASTQSELTLQKHWSLDRITYTCQVITYQGHTFEDSTKKCADSNPRGVS
YLSRSPFDLFIKRSPTTICLVVDLAPSKGTVNLTWSRASGKPVNHSRTRKEEQRNG
TLTVISTLPVGTDRDWIEGETYQCRVTHPLPALMRSTTKTSGPRAAPEVYAFATP
30 EWPGRDKRTLACLIQNFMPEDISVQWLHNEVQLPDARHSTTQPRKTKGSGFFVFS
RLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVPNGKADPSKLPSWAITLISV
NGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

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KSGNTFRPEVHLLPPPSEELALNELVTLTCLARGFSPKDVLRWLQGSQELPREKY
LTWASRQEPSQGTTFITFAVTSILRVAEDWKKGDTFSCMVGHEALPLAFTQKTIDR
LAGKPTHVNVSVVMAEVDADPSNNLLPSWAITLISVNGIFVICCLTYCFAPRCRER
RRNERLRRESVRPV

5

2e12-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (nucleotide sequence)

aagcttatggatttcaagtcagatttccagcttctgataatcagtgctcagtcataatgtccagaggagtcgacattgtctcacc
aatctccagcttcttgctgtgtctctaggtcagagagccaccatctcctgcagagccagtgaaagtgtgaaatattgtcacaagtt
taatgcagtggtaccacagaaacaggacagccaccacaaatctcatctctgctgcataacagtagaactggggctcctggc
10 aggtttatgtggcagtggtgtcggacagacttcagcctcaacatccatcctgtggaggagatgataattgcaattgatttctgcagc
aaagttaggaaggttcttgcagctcgggtggagcaccacagctggaatcaaacgggtgtgcgggtgctcggcgaggagtggtg
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15 aaaaatgaacagtgctgcaaatgtagacacagccagatactactgtgccagagatgggttatgtaacttctattactatgttatgact
actgggggtcaaggaaactcagtcaccgtctcctcagatcacgtctgtccagggacttcacccgccacagtgaaagtattacag
tcgtcctgcgacggcgggcgacgtcccccaccatccagctcctgtgctcgtctctgggtacaccccgagactatcaaat
cacctgggtggaggaaggcaggtcatgcagtgactgtgtccaccgctctaccacgcaaggaggtgagctggcctccacac
aaagcgagtcacccctcagccagaagcactggctgtcagaccgacactacactgccaggtcacctatcaaggtcacacatttga
20 ggacagcaccaagaagtgctgacattccaaccgagaggggtgagcgctacctaaagcggoccagccggcttcgacctgttc
ccgcaagtgcgccacgacacgtctgtgtgtgagcttgccaccagcaaggggaccgtgaacctgacctggctccggcca
gtgggaagcctgtgaaccactccaccagaaaggaggaagcagcgcaatggcaggttaaccgtcactgccacctgccgggtg
ggcaccggagactggatcagggggagacactaccagtgcaagggtgacccaccccaactgccaggggccctcagggelcca
cgaccagacgacggcccgctgtgctgtccccggaaagtctatgcgtttgcgacggcgaggtggcgggagccgggacaagc
25 gcacctcgcctgctgatccagaactcagctgagggacatctcgtgtagtgctgcacaacagaggtgcagctcccggagc
ccggcacagcagcagcagccccgcaagaccaaggcctccgctctctgtcttcagccgctggaggtgaccagccggcgaat
ggagcagcaaaagatgagttcactgccgtgcagtccatgagcagcagagccctcacagaccgtccagcagcgggtgtctgtaa
atccccgtaagcggatcctcgaagctccactcctggccattaccttaactcagtaaatggaaatttttgatagctgctgacct
actgctttgccccagatgcagagagagaaggaggaaatgagagattgagaagggaagtgtacgcccctgtataaatcgata

30

2e12-scFv-human IgE Fc (CH2-CH3-CH4)-CD80 (amino acid sequence)

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MDFQVQIFSLLISASVMSRQVDIVLTQSPASLAVSLGQRATISCRASESVEYYVTS
LMQWYQQKPGQPPKLLISAASNVESGVPARFSGSGSGTDFSLNIHPVEEDDIAMFY
CQQSRKVPWTFGGGKLEIKRGGGSGGGSGGGGSGVQLKESGPGLVAPSQSL
ITCTVSGFSLTGYGVNWVRQPPGKGLEWLGMIWGDGSTDYNSALKSRLSITKDNS
5 KSQVFLKMNSLQTDRTARYYCARDGYSNFHYVMDYWGQGTSTVTVSSDHVCSR
DFTPTVKILQSSCDGGGHFPPTIQLLCLVSGYTPGTINITWLEDGQVMDVDLSTAS
TTQEGELASTQSELTSQKHWSLDRYTCQVTYQGHTFEDSTKKCADSNPRGVSA
YLSRSPFDLFIKSPITITCLVVDLAPSKGTVNLTVSRASGKPVNHSTRKEEKQRNG
TLTVTSTLPVGTDRDIEGETYQCRVTHPLPRALMRSTTKTSGPRAAPEVYAFATP
10 EWPGRDKRTLACLIQNFMPEDISVQWLHNEVQLPDAHSTTQPRKTKSGGFFVFS
RLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVNPGKADPSKLPWAITLISV
NGIFVICCLTYCFAPRCRERRRNERLRRESVRPV

500A2 scFv (nucleotide sequence)

15 atgtgtatatacatcagctccttggccttttactctcttggaattcagcctocagaagtgacatagtgctgactcagactccagccactc
tctctctaattcctggagaagagtcacaaatgacctgtgaagaccagtcagaatattggcacaatcttacactggatcaccaaaacc
aaaggagggtccaagggtctcatcaagtatgcttcgagctcattctcgggatccctccagattcagtgccagtggttcgaaac
agatttcactctcagcatcaataacctggagcctgatgatatcgaatttattactgtcaacaaagtagaagctggcctgcacgttcg
gtcctcggcaccaggctggagataaaacgggtggcgggtggctcggcgagggtgggtcggcgccgcatcaggtcaa
20 gctgcagcagtcocggttctgaactagggaacctgggacctcagtgaaactgtcctgcaagacttcaggtcatattcacagatc
actatattcttgggtgaaacagaagcctggagaaagcctgcagtgatagaaatgtttatggtgaaaigtgtgtaacagctaca
atcaaaaattccaggccaaggccacactgactgtagataaaatctctagcacagcctacatggaactcagcagcctgacatctgag
gattctgccatctattactgtgcaagaaggccggtagcgacgggcatgctatggactactgggtcaggggatccaagtaccgt
ctcctctgac

25

500A2 scFv (amino acid sequence)

MLYTSQLLGLLLFWISASRSDIVLTQTPATLSLIPGERVTMTCKTSQNIGTILHWYH
QKPKEAPRALIKYASQSIPIPSRFSGSGSETDFTLSINNLEPDDIGIYYCQQRSWPV
TFGPGTKLEIKRGGGSGGGGSGGGGSGVQLQSGSELGKPGASVKLSCKTSYIF
30 TDHYSISWVKQKPESLQWIGNVYGGNGGTSYNQKFQKGATLTVDKISSTAYMEL
SSLTSEDSAIYYCARRPVATGHAMDYWGQGIQVTVSSD

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NT

5' oligo:

Name : IgGWT3

GTTGTTTTCGAAGGATCCGCTTTACCCGGAGACAGGGAGAGGCTCTT

5 NT

3' oligo:

Name : hIgGWT5

GTTGTTAGATCTGGAGCCCAATCTTGTGACAAAACCTCACACATG

NT

10 5' oligo:

Name : FADD5

Sequence

GTTGTGGATCCTTCGAACCCGTTCTCGGTGCTGCTGCACTCGGTGTCG

NT

15 3' oligo:

Name : FADD3

Sequence

GTTGTATCGATCTCGAGTTATCAGGACGCTTCGGAGGTAGATGCGTC

NT

20 **FADD-CSSCFV (nucleotide sequence)**

gtggatccttcgaacccgttcctggtgctgctgcactcgggtgtcgtccagcctgtcagcagcgcagctgaccgagctcaagttccta
tgctcctgggocgcgtgggcaagcgcagctggaagcgcgtgcagagcggccttagacctcttccatcgtgctggagcagaacga
cctggagcccgggcacaccgagctcctgcgcgagctgctgcctccctgcggcgccacgacctgtcgtggcgctgcgacgact
tcgagggcgggcgggcgccggggccgcgcctgggggaagaagacctgtgtgcagcatttaacgtcatatgtgataatgtgggg
aaagatttggaagagctgctcgtcagctcaaatgtcagacaccaagatcgacagcatcgaggacagatccccgcgaacctg
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tcaggctcgcagatgaacctgggtgctgacctggtacaagaggtcagcaggccgtgacctccagaacaggagtggggcca
tgtccccgatgtcatggaactcagcgcattacctccgaagcgtcctgataactcgagatcgataacaac

30 **FADD-CSSCFV (amino acid sequence)**

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VDPSPNPFLLVLLHSVSSSISSSELTTELKFLCLGRVGRKLERVQSGLDLFSMLEQND
LEPGHTELLRELLASLRRHDLRRVDDFEAGAAAGAAPGEEDLCAAFNVICDNVG
KDWRRLARQLKVSDTKIDSIEDRYPRNLTERVRESLRIWKNTOKENATVAHLVGA
LRSCQMNLVADLVQEVQQARDLQNRSGAMSPMSWNSDASTSEAS

5

HCD28tm5B (nucleotide sequence)

GTTGTGGATCCTCCCTTTTGGGTGCTGGTGGTGGTGGTGTCTGGCTTGCTAT
AGCTTG

10 **HCD28tm3S** (nucleotide sequence)

GTTGTTTCGAACCCAGAAAATAATAAAGGCCACTGTACTAGCAAGCTATAGC
AAGCCAG

HCD28tm5' (nucleotide sequence)

15 GTTGTGGATCCTCCCTTTTGGGTGCTGGTGGT

HCD28tm3' (nucleotide sequence)

GTTGTTTCGAACCCAGAAAATAATAAAGGCCAC

20 **HCD80tm5'** (nucleotide sequence)

GTTGTGGATCCTCCTGCTCCCATCCTGG

HCD80tm3' (nucleotide sequence)

25 GTTGTTTCGAACGGCAAAGCAGTAGGTCAGGC

MFADD5BB (nucleotide sequence)

GTTGTGGATCCTTCGAACCCATTCTGGTGTGCTGCACTCGCTG

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MFADD3XC (nucleotide sequence)

GTTGTTATCGATCTCGAGTCAGGGTGTTCAGGGAAGACAC

- 5 **Murine FADD nucleotide sequence** (full length, but without flanking -Ig or transmembrane sequences) (**nucleotide sequence**)

gtggatcctcgaacatggaccattcctggtgctgctgcactcgtgtccggcagcctgtcgggcaacgatctgatggagctcaa
gttcttgtccgcgagcgcgtgagcaaacgaaagctggagcgcgtgcagagtgccctggacctgttcacgggtgctgtggagca
gaacgacctggagcgcgggcacaccgggctgctgcgcgagttgctggcctcgtgcgcgcacacgatctactgcagcgcctgg
10 acgacttcgaggcggggacggcgaccgctgcgccccggggaggcagatctgcaggtggcatltgacallgtgtgtgacaatg
tggggagagactggaagactggcccgcgagctgaaggtgtctgagcccaagatggatgggatggaggagaagtaacccccg
aagctctgagtgagcgggtaaggagagctctgaaagctggaagaatgctgagaagaagaacgctcgggtggccggactggtca
aggcgctgcggacctgcagcgctgaatctgtggtgacctgtgtggaagaagcccaggaatctgtgagcaagagtgagaatatgt
ccccgactaaggagattcaactgtgtcttctcagaacaccctgactcgagatcgat

15

Murine FADD (amino acid sequence)

VDPSNMDPFLVLLHSLSGSLSGNDLMELKFLCRERVSKRKLERVQSGLDLFTVLLE
QNDLERGHTGLLRELLASLRHDLQRLDDFEAGTATAAPPGEADLQVAFDIVCD
NVGRDWKRLARELKVSEAKMDGIEBKYPRLSERVRESLKVWKNAEKKNASVA
20 GLVKALRTRCLNLVADLVEEAQESVSKSENMSPLVRDSTVSSSETP

MCASP3-5 (nucleotide sequence)

GTTGTGGATCCTTCGAACATGGAGAACAAACAAACCTCAGTGGATTCA

- 25 **MCASP3-3 (nucleotide sequence)**

GTTGTTATCGATCTCGAGCTAGTGATAAAAGTACAGTTCCTTCGT

MCASP8-5 (nucleotide sequence)

GTTGTTTCGAACATGGATTTCAGAGTTGTCTTTATGCTATTGCTG

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MCASP8-3 (nucleotide sequence)

GTTGTATCGATCTCGAGTCATTAGGGAGGGAAGAAGAGCTTCTTCCG

5 **hcasp3-5(nucleotide sequence)**

GTTGTGGATCCTTCGAACATGGAGAACACTGAAAACCTCAGTGGAT

hcasp3-3 (nucleotide sequence)

GTTGTATCGATCTCGAGTTAGTGATAAAAATAGAGTTCTTTGTGAG

10

hcasp8-5 (nucleotide sequence)

GTTGTGGATCCTTCGAACATGGACTTCAGCAGAAATCTTTATGAT

hcasp8-3 (nucleotide sequence)

15 GTTGTATCGATGCATGCTCAATCAGAAGGGAAGACAAGTTTTTTCT

1. 2H7 scFv with alternative VHL11 mutations:

Nucleotide sequence

20 Aagcttgccgcacatggatttcaagtcagatgttcagcttctgctaactcagtcgcttcagtcataattgccagaggacaaaattgtctc
tccagctctccagcaatcctgtctgcatctccaggggagaggtcacaatgacttcagggccagctcaagtgfaagttacatgcac
tggaccagcagaaagccaggtactcccccacccctggatttatgcccacccaactggctctgagtcctctgctcgttcagt
ggcagtggtctctgggacctcttactctcacaatcagcagagtgagggtgaagatgctgccacttattactgccagcagtggaagt
tttaaccacccacgttcggtgctgggaccaagctggagctgaagatggcgggtgctcggggcgtggtggaatctggaggaggt
gggagctctcaggttatctacagcagctctggggctgag (one of the following: tcn, acn, gan, can, aan,
25 cgn, agn)
gtgaggcctggggcctcagtggaagatgtcctgcaaggctctggctacacattaccagttacaatatgcactgggtaagcagaca
cctagacaggggcctgggaatggaatggagctattatccaggaaatgggtgatacttctcacaatcagaaagtcaaggccaaggccac
actgactgtagacaaatctccagcacagcctacatgcagctcagcagcctgacatctgaagactctgggtctattctgtgcaag
agtgggtgactatagtaacttactgggtacttgatgtctggggcacagggaccacggtcaccgtctctctgatcag

30

Amino acid sequence

MDFQVQIFSLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
25 QKQPGSSPKPWYAPSNLASGVPARFSGSGSGTYSLSLTISRVEAEDAATYYCQQWS
ENPPTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAE (one of the following:
35 S, T, D, E, Q, N, R, K, H)
VRPGASVKMSCKASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFK

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PT/US2003/041600

GKATLTVDKSSSTAYMQLSSLTSEDSAVYFCARVVYYNSYWYFDVWGTGTVTV
VSSDQ

2. VHL11 deletion

5 Nucleotide sequence:

Aagcttgcgccatggatttcaagtgacagatttcagcttctgctaatacagtgcttcagtcataattgccagaggacaaatgttctc
tccagcttccagcaatcctgtctgcatctccagggagagaaggtcacaaatgactgcaggggccagctcaagtgtaagttacatgcac
tggtaaccagcagaagccaggatctcccccacccctggattatgccccatccaaactgccttcaggatccctgctcctcagtgct
ggcagtggtgtctggaccctctactctctcacaatcagcagagtgagggtgaagatgctgccacttattactgccacagtgaggat
10 tttaaccaccacgtctgtgctgggaccaaagctggagctgaagatggcgggtgctcggcggtgtgtgagatcggaggaggt
gggagctctcaggcttatctacagcagctctggggctgagggtgagcctcgggcctcagtgaaatgctcctgcaagggtcttgct
acacattaccagttacaatgatcactgggtaaacgacacacctagacagggcctggaatggatggagctattatccaggaaatg
gtgatacttccataacacagaagttcaagggcaaggccacactgactgtagacaatctctcagcacagcctacatgcagctcagc
agcctgacatctgaagactctgcgtctatttctgtgcaagagtggtgtactatagtaactcttactgtagcttgatgctgtggggcaca
15 gggaccacgggtcaccgtctctcttgatcag

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKPKGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEADAATYYCQQWS
20 FNPTTFGAGTKLELKDGGSGGGSGGGSGQAYLQSGAEVRPGASVGMKSCA
SGYTFTSYNMHVVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSST
AYMQLSSLTSEDSAVYFCARVVYYNSYWYFDVWGTGTVTVTVSSDQ

3. 2H7 VL L106 with alternative mutations

25 Nucleotide sequence:

aagcttgcgccatggatttcaagtgacagatttcagcttctgctaatacagtgcttcagtcataattgccagaggacaaatgttctct
ccagcttccagcaatcctgtctgcatctccagggagagaaggtcacaaatgactgcaggggccagctcaagtgtaagttacatgcact
ggtaaccagcagaagccaggatctcccccacccctggallatgccccatccaaactgccttcaggatccctgctcctcagtgct
gcagtggtgtctggaccctctactctctcacaatcagcagagtgagggtgaagatgctgccacttattactgccagcagtgagtt
30 taaccacccacgttctggtctgggaccaagctggag (tcn, agn, aan, cgn, can, gan, and non-natural
derivatives of these codons) aaagatggcggtgctcggcggtgtggatctggaggaggtggagctc

Amino acid sequence:

MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
35 QKPKGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEADAATYYCQQWS
FNPTTFGAGTKLE (S, T, R, K, H, Q, N, D, E, and non-natural derivatives of these
amino acids at position 106)KDGGSGGGSGGGSS

4. VL L106 deletion

40 Nucleotide sequence:

Aagcttgcgccatggatttcaagtgacagatttcagcttctgctaatacagtgcttcagtcataattgccagaggacaaatgttctc
tccagcttccagcaatcctgtctgcatctccagggagagaaggtcacaaatgactgcaggggccagctcaagtgtaagttacatgcac
tggtaaccagcagaagccaggatctcccccacccctggallatgccccatccaaactgccttcggagtcctgctcctcagtgct
ggcagtggtgtctggaccctctactctctcacaatcagcagagtgagggtgaagatgctgccacttattactgccacagtgaggt
45 tttaaccacccacgttctggtctgggaccaagctggagaaagatggcgggtgctcggcggtgtgtagtctggaggaggtgg
gagctc

Amino acid sequence:

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PCT/US2003/041600

MDFQVQITFSLILISAVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QOKPGSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLEKDDGGSGGGSGGGGGSS

5. **IgE CH3 CH4**

Nucleotide sequence:

10 tccaccgcagaggggtgagcgctacctaagccgcccagcccgctgacctgttcatccgaagtgcgccagatcacctgtc
tgggtgtgacctgtgaccaccagcaaggcgaccgtgaacctgacctgtgccggccagtgaggaaacctgtgaacctccacc
agaaaggagggagagcagcgcgaatggcacgttaaccgtcacgtccacctcgccgtggggaccaccgagactggatcgaagggg
15 agacctaccagtgacgggtgaccacccaccacgtgccacgggcccctcatgcggtccacgaccagaccagcggcccgtgct
gccccggaagtctatcggtgtgcgacgccggagtgggcggggagccgggacagcagccaccctcgctgacctgacaccgaactt
catgacctgaggacatctcgtgcagtggtcgcacaaagcaggtgcagctccggagcccccggcacagcagcagcagccccc
aagacaaaggctccggctctctcttcagccgcttgaggtgaccagggccgaatggggagcagaagaatgagttcatctgccc
gtgcagttccatgagcgagcagcccccctcacagacctccagcagcagcggtgtctgtaaatcccggttaatgataatctagaa

Amino acid sequence:

20 SNPRGVSA YLSRPSFDFLIRKSPITITCLVVDLAPSKGTVNLWTSRASGKPVNHSTR
KEEKQRNGTLTVSTLPVGTTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAA
PEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDARHSTTPQRK
TKSGGFFVFSRLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSNPNKG

6. **hIgG1H/IgE WCH3 WCH4**

Nucleotide sequence:

25 tgaatcaggagcccaatctctgcacaaactcacatcccacccgctcccagcatccaaccgagaggggtgagcgccatccta
agccggcccagcccgctgacctgttcatccgaaagtcgccacgatcacctgtctgtgtggtgacctggcaccaccgaagggtg
acctgtgaacctgacctgtgtccggggcagtgagggaagcctgtgaaccactccaccagaaaggaggaagacagcgcaatggca
cgttaacctcagctcagctccacctccgggtggcaccgccagagactgagtgagggggagactaccagtgcagggtgacctacccc
30 cactctcccaaggccctcatcggtgcacgaccaagaccagcggcccgcgtgctgccccggaagctatgcgttggcagcgc
ggagtggcggggagacccgggacaagcgcaacctcgccctgctgatccgaactcatgctgaggagacatctcgtgtcagtggt
gcacaacgaggtgcagctccggagccggcgacagcagcagcagccccgaagaccagggtccggctctctctctc
gcgccttggaagtgaccagggccgaatgggagcagaagaatgagttcatctgccgtgcagttccatgagcgagcagcagccctca
cagacctgcagcgagcgtgtctgtaaatcccggttaatgataatctagaa

Amino acid sequence:

35 DQEPKSSDKTHTSPSPASNPGRVSA YLSRPSFDFLIRKSPITITCLVVDLAPSKGTV
NLWTSRASGKPVNHSTRKEEKQRNGTLTVSTLPVGTTRDWIEGETYQCRVTHPHL
PRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLH
NEVQLPDARHSTTPQRKTKSGGFFVFSRLEVTRAWEQKDEFICRAVHEAASPSQ
40 TVQRAVSNPNKG

7. **IgE WCH2 WCH3 WCH4**

Nucleotide sequence:

Tgatcactgtctccagggacttcccccggccaccgtgaagattctacgtctcctgcagcggcggggacatctccccg
accactcagctcctgtgctcgtctgtgggtacccccagggactatcaatcaccttgctgaggagcggcgaggtcatggacg
45 tgcactgttccacgcgctctaccacagcaggaggtgagctggcctccacaaagcgagctcaccctcagcagaagcactggc
tgtcagacccgacctacacctgccaggtcacctatcaagctgcacactttgaggacagcaccagaagtgtagcagattcaaccc
gagaggggtgagcgccacttaataagccggccagcccgttgcactgttcatccgaagctgcccaccagatcacctgtctgtgtgtg
gacctggcacccagaaggggacctggaacctgacctgtgcccggccagtgaggagcctgtgaaacctccaccagaaagg
50 agggagagcagcgcgaatggcagcttaaccgtcagctccacctgocggtggggaccaccgagactggatcagggggagacctta
ccaagtgaagggtgaccacccccacctgccagggccctcatgcgtgcacagaccagaccagggcccccgtgctgctgccc
gaaagtcatgcgttgcgacgcccggagtgcccggggagccgggacaaagcgacacctgctgctgacatcaagactatgcct

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gaggacatctcgggtgcagctgctgcacaacgaggtgcagctccccggacgccggcacgacgacgagccccgcaagacc
aagggtccctcgctctctcgtctcagccgctggagtgaccaggccgaatgggacgagaaagatgagttcatctgccgtgcac
tccatgagcagagcccccctcacagaccgtccacgagcgggtgtctgtaaatcccggtgaaatgataatctaga

- 5 Amino acid sequence:
DHVCSRDFTPPTVKILQSSCDGGGHPPTIQLLCLVSGYTPGTINTWLEDGQVMDV
DLSTASTTQEGELASTQSELTLQKHWSLDRTYTCQVITYQGHFTFEDSTKKCADSN
PRGVSAYLSRSPFDFLIRKSPITITCLVVDLAPSKGTVNLTSRASGKPVNHSRKE
EKQRNGTLTVTSTLPVGTTRDWIEGETYQCRVTHPHLPRALMRSTTKTSGPRAAPE
10 VYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDARHSTTPRKTK
GSGFFVFSRLEVTRAWEWEQKDEFICRAVHEAASPSQTVQRAVSVNPGK

8. hIgG1H/IgE CH3 CH4 (ORF)

Nucleotide sequence:

- 15 tgatcaggagcccaaatctctgcacaaactcacacatccccaccgtccccagcatccaacccgagagggggtgagcgccaccta
agccggccagcccgcttgactgtttcatccgaagtcgcccagatcacctgtctgggtggtgacctggccaccagcaagggg
accgtgaacctgacctgtccctccggccagctgggaagcctgtgaaccactccacagaagggaggaagcagcgcaatggcga
cgttaaccgtcacgtccacccctccggtggcgacccgagactgcatcgagggggagacctaccagtgaggggtgacccacccc
cactctgcccagggccctatgcggtccacgaccaagaccagcgcccggtgctgccccgggaagtctatgcgtttgcagcc
20 ggagtgcccggggagccgggacaagcgacccctgcctgctgatccagaactctcatgagcacatctcggtgcagtggtct
gcacaacgaggtgcagctccccgacgcccggcacagcagcagcagcagcccccgaagcaaggggtccggtctctcgtcttca
cgccgctcgaggtgacaggccgaatgggacgagaagaatgagttcatctgcccgtgcagtcctatgagggcagcgagccctca
cagccgtccagcgagcggtgtctgtaaatccgggtaaagggtacctctaga

- 25 Amino acid sequence:
DQEPKSSDKTHTSPSPASNPRGVSAYLSRSPFDFLIRKSPITITCLVVDLAPSKGTV
NLTWSRASGKPVNHSRKEEKQRNGTLTVTSTLPVGTTRDWIEGETYQCRVTHPHL
PRALMRSTTKTSGPRAAPEVYAFATPEWPGSRDKRTLACLQNFMPEDISVQWLH
NEVQLPDARHSTTPRKTKSGSFFVFSRLEVTRAWEWEQKDEFICRAVHEAASPSQT
30 VQRAVSVNPGKSGSFE

9. 2H7 VHL11S scFv hlgG1(SSS-S)H hlgE WCH3 WCH4

Nucleotide sequence:

- aagcttgcgcccatgatttcaagtcagatttcagcttctctgaatcagtgcttcatgataaattgccagaggacaaattgttctct
35 cccagctcccaacaaatctgtctgcatctccagggaaggtcacaaatgacttgaggggccagctcaagtgtaagttaactgact
ggtaaccagcagaagcaggaatctcccccaaaccttgattatgccccatcaaacctggctcttgagggtccctgctcgttcagtg
gcagtggtctgtgggaccttactactctcacaatcagcagagtgaggctgaagatgctgccatttattactgccagcagtggaatt
taaccaccacagcttgcgtgctggaccagaagctggagctgaaagatggcggtggctcgggcggtgtggatctggagagagtg
ggagctctcagggattatcacagcagctctgggctgagtcgtgagggcctggggcctcagtgaaagtgtctcgaaggctcttgcc
40 tacacatttaccagttacaattatgcactgggtaaagcagacacatagacagggcctgggaatggattgagctatttaccaggaat
gggtataattctcacaatcagaatttcaaggccaaaggccacactgactgtagacaaatctccacagacgctcactcagctcag
cagcctgacatctgaagactctgctggtctattctgtcgaagagtggtgactactatgtaactcttactgtaactctgctgtgggac
agggaccacagctcagcgtctctctgtacagagcccaaatctctgcacaaactcacacatcccaactcctcagcatccaac
cagagagctgtgagcgctcactaaaggccgcccagcccgctgacgtgttcatccgaaagtcgcccacacactcgtctgtgtgt
45 gtaactgggacccagcagaaggaccgtgaacctgacctgtgccgggccaagtggaagcctgtgaacctccacacagaaag
gaggaagacagcagcagtgacgttaaacgtcacgtccacccctccgggtgggaccccgagactggtatcgaggggagacct
accagtgcagggtgagccaccccaacctgccagggccctcatcggttcacagacaaagcagcagcgccggcgctgctgcccc
ggaaagtctatgctttggagcagccggagtgccggggagccgggacacagcgccaccctgctgctgactacgaacttactgccc
tgaagacatctcgtggtcagtggtgcacaacgaggtgcagctccccggagcggcgacacagcagcagcagcagcccgcaagacc
50 aagggtccggtctctctgctcagccgctggagtgaccagggccgaatgggacgagaaagatgagttcatctgcccgtgcag
tccatgaggcagcagccctcacagaccgtccagcagcggtgtctgtaaatccgggtgaaatgataatctaga

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ECT/US2003/041600

Amino acid sequence:

MDFQVQIFSLLISASVIIARGQIVLSQSPAILSASPGKEVTMTCRASSVSVMHWY
QKPKGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
5 FNPPTFGAGTKLELDKGGSGGGSGGGSSQAYLQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSYWYFDVWGTGTTVTYSSDQEPKSSDK
10 THTSPSSASNPRGVSAIYLRSPSPFDLFIKSPITCLVVDLAPSKGT/VNLTWSRSG
KPVNHSTRKEEKQRNGTLTVTSTLPVGTDRWIEGETYQCRVTHPHLPALMRSTT
KTSGPRAAPEVYAFATPEWPWPSGRDKRTLACLQNFMPEDISVQWLHNEVQLPDAR
HSTTQPRKTKGSGFFVFSRLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVPN
GK

10. 2H7 VHL11S scFv hIgG1(SSS-PH hIgE WCH3 WCH4

Nucleotide sequence:

aagcttgccgccatggatttcagtgacagatttcagcttctgctaatacagtgcttcagtcataaattgccaggacaaattgtctct
cccagctccagcaatctctgctgcatctccaggaggagaggtcacaatgacttcgagggccagctcaagtgtaagtacatgcact
5 ggtaaccagcagaagccagagctctcccccaaacctcgattatgcccaatccaaactggcttcggagtcctctgctgcttcagtg
cagctggctctggagacccttactctctcacaatcagcagaagtgaggctgaagatgctgccaacttactgccaagcagtggaatt
20 taaccaccacccagcttcggtgctgggaccaaagctgagctgaagatggcggctgctcggcggctgctggatctggagagggg
ggagctctcaggcttatctacagcagctcgggctgagtcgggagcctgggagcctcagtggaatgctctcgaaggctcttgcc
tacacattaccagttacaatgatcactgggttaagcagacacctagacaggggcctggagtgattgagctattatccaggaaat
ggtagattctctacacatcagaagttcaaggcgaaggccacactgactgtagacaaatctccagcagacgctacatgcagctcag
25 cagcctgcacatctgaagactctgctgctattctgtgcagaagtgctgtactatagtaactcttaactggtactgctatgctgggac
aggagacacagctgcaacctctctctgacaggaagcccaaatcttgacaaaactcacacatcccaaccgtgcccagacatccaac
cgaagaggggctgagccgctacctaagccggccagcccgcttcgactgttaccgcgaagctgccacgatcacctgtctgtggt
ggactctggcaccagcgaagggacggcgtgaactgacctggctccgggccaagtggggaagcctgtgaaccatccacagaagaag
30 gaggaggaagcagcgaatggcagctaacgctcagctccacctgcccgtgggacccgagactggatcaggggagagacct
accagctgaggggtgaccaccccccactgcccaggccctcatgctggctccagaccaaagcagcggcccgctgctgctcc
ggagctctatgctgttgcgacggccggagtgccggggagccgggacaaagcgacccctgctgctgattccagaacttcatgccc
tgaaggacatctcgtgctcagtgctgcacaaaggggtgcagctccggagcggcggcacagcagcagcagcggccggaagacc
aagggtctccgcttctctgtcttcagccgctggaggtgaccagggccgaatgggagcagaagaatgattgattcctgctgagcag
35 tccatgagcagcagagccctcacagaccgtcagcagcgggtgctgtgtaataccgggtaattgataactcaga

Amino acid sequence:

MDFQVQIFSLLISASVIIARGQIVLSQSPAILSASPGKEVTMTCRASSVSVMHWY
QKPKGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
5 FNPPTFGAGTKLELDKGGSGGGSGGGSSQAYLQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGKATLTVDKSSS
40 TAYMQLSSLTSEDSAVYFCARVYYNSYWYFDVWGTGTTVTYSSDQEPKSSDK
THTSPSPASNPRGVSAIYLRSPSPFDLFIKSPITCLVVDLAPSKGT/VNLTWSRSG
KPVNHSTRKEEKQRNGTLTVTSTLPVGTDRWIEGETYQCRVTHPHLPALMRSTT
KTSGPRAAPEVYAFATPEWPWPSGRDKRTLACLQNFMPEDISVQWLHNEVQLPDAR
50 HSTTQPRKTKGSGFFVFSRLEVTRAWEQKDEFICRAVHEAASPSQTVQRAVSVPN
GK

10. 2H7 VL L106S

aagcttgccgccatggatttcagtgacagatttcagcttctgctaatacagtgcttcagtcataaattgccaggacaaattgtctct
cccagctccagcaatctctgctgcatctccaggaggagaggtcacaatgacttcgagggccagctcaagtgtaagtacatgcact
5 ggtaaccagcagaagccagagctctcccccaaacctcgattatgcccaatccaaactggcttcggagctcctgctcgttcagtg

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gcagctgggctctgggacaccttactctctcacaatcagcagagtgaggctgaagatgctgccatttactgcccagcagtgaggatt
taaccacccacagcttgcgtgctggaccaagctggagctgaagatggcggctgctcggcggtggtgagctggaggaggtg
ggagctc

5 Amino acid sequence:

MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGSGGGSS

10 11. 2H7 VL L106S scFv

Nucleotide sequence:

aagcttgccgccatggaatttcaagtcagattttcagcttctgtaatacagtgcttcagtcataatgccagaggacaattgttctc
ccagctctccagcaatcctgtctgcatctccaggggagaggtcacaatgactgcaggggcagctcaagtgtaagtacatgcact
ggtaccagcagaagccagatcctccccaacccctggattatgcccatccaactggtctcggagctccctgctcgttcagtg
15 gcaatgggtctgaggaccttactctctcacaatcagcagagtgaggctgaagatgctgccatttactgcccagcagtggaatt
taaccacccacagcttgcgtgctggaccagaagctggagcttaaaagtcggcgtgctcggcggtggtgagctggaggaggtg
ggagctctcaggcttatctacagctctgggctgagctggtgaggcctggggcctcagtggaagatgctcgaaggctctggc
tacacatttaccagttacaatgactcagtggaagaagcagacactagacaggccctggaatggatggagctattatccaggaaat
ggtgatactctcacaatcagaagttcaaggccaagggccacactgactgtagacaatactccagcagacgctacatgcagctcag
20 cagctgacatctgaagactctgcggtctatctgtgcaagagtggtgactatagtaacttactgtaactctcatgctctggggcac
agggaccacagctcaccgtctctctgacag

Amino acid sequence:

MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
25 QKQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGSGGGSSQAYLQQSGAELVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSYWFYD VWGTGTTVTVSSDQ

30 12. 2H7 scFv VL L106S VHL11S scFv

Nucleotide sequence:

Aagcttgccgccatggaatttcaagtcagattttcagcttctgtaatacagtgcttcagtcataatgccagaggacaattgttctc
tccagctctccagcaatcctgtctgcatctccaggggagaggtcacaatgactgcaggggcagctcaagtgtaagtacatgcac
tggtaaccagcagaagccaggtatcctccccaacccctggattatgcccatccaactggctctcggagctcctgctcgttcagt
35 ggcagtggtgctgggaccttactctctcacaatcagcagagtgaggctgaagatgctgccatttactgccagcagtggaat
tttaaccacccacagcttgcgtgctggaccaagctggagcttaaaagatggcgtgctcggcggtggtgagctggaggaggt
ggagctctcaggcttatctacagcagcttgggctgagctggtgaggcctggggcctcagtggaagatgctcgaaggctctg
gctacacatttaccaggttacaatgactgggtaagcagacactagacaggccctggaatggatggagctattatccaggaa
atggtgatacttctacaatcagaagttcaaggcgaaagccacactgactgtagacaatactccagcagacgctacatgcagctc
40 agcagctgacatctgaagactctgcggtctatctgtgcaagagtggtgactatagtaacttactgtaactctcatgctctggggc
acaggaccacagctcaccgtctctctgacag

Amino acid sequence:

MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
45 QKQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLESKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSYWFYD VWGTGTTVTVSSDQ

50 10. Human IgD hinge linker with attached restriction sites

Nucleotide:

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PCT/US2003/041600

gttgatccagggttcgaagcttccaagggcagggcctctccgtgccactgcacaaccccgaagcagagggcgagcctgccaa
ggcaaccacagccccagccaccctgaacacaggaagagagagaagaagaagaagagagaagagaagaagagaga
caagaagagagagagacaagaaccggctgcatgctgacg

- 5 Amino acid:
VDPGSKSPKAQASSVPTAQPQAEGLAKATTAPATTRNTGRGGEEKKKEKEKEEQ
EERETKTGAVD

Sequence of Native IgD hinge domain:

- 10 (includes a cysteine residue—we truncated the hinge prior to that residue for these
constructs:)

Nucleotide:

gagttctcaaaaggcagggcctctctcgtgccactgcacaacccccaaagcagagggcgagcctgccaaaggcaaccacagccc
cagccaccacccgtaacacaggaagagggagagaaagaagaagaaggaagaagggaacaagaagaagagagaga
15 gacaagaacaccagaggtgtccgagccacaccagcctcttggcgtctacctgtaacacct

Amino acid sequence:

ESPKAQASSVPTAQPQAEGLAKATTAPATTRNTGRGGEEKKKEKEKEEQEERET
KTPECPHSHTQPLGVYLLTP

- 20

12. 2H7 VH L11S

Nucleotide sequence:

caggcttatctacagcagctctggggctgagtcggtagggcctggggcctcagtgaaagatctctcgaaggctcttgctcacacattt
accagttacaattatgcacatgggtaagacagacacctagacagggcctggaatggattggagctattatccaggaaatgggtgatact
25 tctacaatcagaaagtccaaggcgaaggccacactgactgtagacaatatctccagcacagcctacatgcagctcagcagcctga
catctgaaagactctgggctctattctgtgcaagaagtggtgtactatagtaactcttactggtaactgatgtctggggcacagggacc
aaggctcaccgtctctct

Amino acid sequence:

- 30 QAYLQQSGAESVRPGASVKMSCKASGYTFTSYNMHWVKQTPRQGLEWIGATYPG
NGDTSYNQKFKGKAILTVDKSSSTAYMQLSSLTSEDSAVYFCARVYVYSNSYWY
FDVWGTGTTVTVSS

13. 2H7 VH L11S scFv

- 35 Nucleotide sequence:

aagcttgcgcgaatgatttcaagtcagatfttcagcttctgctaatacagtgcttcagtcataatgccagaggacaaattgtctct
cccagttccagcaatcctgtctgcatctccaggggaagaaggctcacaatgacttcagggccagctcaagtgtaagttacatgcact
ggttacacagcagaagccaggaatcctcccccaaccctggattatgccccatcaaacctggtctctcggagtgccctgtcgtcctcagtg
gcagtggtgcttgggacctcttactctctacatacagaagtgaggagctgaagatgctgccacttatctccagcagcagtggaatt
40 taaccacacacggttcgggtgctgggaccaagctggagctgaaagatggcgggtgctcggcggtgtggtgctatcggaagaggtg
ggagctctcaggttatctacagcagctctgggctgagtcggtagggcctggggcctcagtgaaagatgtctcgaaggcttctggtc
tacctatccaggttacaattgcactgggtaagcagacacctagacaggcctggaatgattggagctattatccaggaaat
ggtgatattctctacaatcagaagtcgaaggcagccacactgactgtagacaaatcctccagcagcctacatgcagctcag
cagctcagcactggaagactctgggctctattctgtgcaagagtggtgtactatagtaactcttactgtgtaactgatgtctggtggcac
45 agggaccacggctcaccgtctctctgacag

Amino acid sequence:

- MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGKEVTMTCRASSVSVMHWY
50 QQKPGSSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPPITFAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK

WO 2005/017148

PCT/US2003/041600

ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTVSSDQ

14. 2H7 scFv VH L1S hlgG1 (CSC-S)H WCH2 WCH3

Nucleotide sequence:

5 aagcttgcgccatggaatttcaagtcagattttcagcttctgctaatacagtgcttcagtcataaattgccaggagacaattgttctct
ccagctctccagcaatctgtctgcatctccaggaggagaaggtcacaatgacttgcaggccagctcaagttctaatgattacatgcact
40 ggtaccagcagaagccaggatctctccccaacacctggattatgccccatcaaacctggcttctggagtcctgtcgttcagtg
gcagtggtgtctggacctctactctctcacaatcagcagagtgaggctgaagatgctgccacttattactgccagcagtggaattt
taaccaccacgtgtcgtctggaccagaagctggagctgaagaatggcgggtgctcggcggtgtggaictggaggaggtg
10 gggagctctcaggcttatctacagcagctctggggtgagtcgtgaggcctggcgccagtgaaatgctcctcgaaggcttctggtc
acacatttaccagttacaatatgactgggtaagcagacacctagacagggcctggaatggattggagctatttatccaggaatg
gtgatactctcaatcagaagttcaaggcgaagccacactgactgtagacaatctccagcacagcctactgcagctcagc
agcctgacatctggaagactctgggtctatttctgtgcaagagtggtgtactatgtaactcttactgtctactcgaatgcttggggcaca
15 gggaccacggctaccgltctctgtatcaggagccaaatctgtgacaaactcacaatctccacgtgctcagcactggaactc
ctgggtggagcgtcagcttctctctccccaacaaaggacacacctcatgactccggaccctgaggctcagctcgtgtgt
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cggggggaggagcagtcacacagcagctaccgtgtgttcagcgtctcaccgctcctccacaggactggctgaatggcgaaggag
20 tacaagtgcaaggtctccacaagaagccctccagccccatcgagaanaacatctccaaagccaaaggcagccccggaacc
taccgtgtacactcgtcccccattccgggtgagctgaccaaagaacagctcagctgacctgcctgtcacaagctctatcca
agcgacatcgccgtggaatgggagagcaatgggcagccggagaacaactacaagacacgcctcccgctgctggactccgacg
ctctcttctctctacagaagctcaccgtggacaaagcaggtggcagcaggggaacgtctctctgctcgtgatcatgag
25 gctgtcacaacactacacagaaggcctctcctgtctccgggtgaatgatctaga

Amino acid sequence:

25 MDFQVQIFSLISASVUIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKQPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQWS
FNPTTFGAGTKLELKGDDGGSGGGSGGGSSQAYLQQSGAESVRPAGASVKMSCK
30 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTVSSDQEPKSCDK
THTSPPCSAPBLLGGPSVFLFPPKPKDITLMISRTPEVTCVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKLGFPYSDIAVWEWESNGQPE
35 NNYKTTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSL
SPGK

15. 2H7 scFv VH L1S IgE WCH2 WCH3 WCH4

Nucleotide sequence:

40 aagcttgcgccatggaatttcaagtcagattttcagcttctgctaatacagtgcttcagtcataaattgccaggagacaattgttctct
ccagctctccagcaatctgtctgcatctccaggaggagaaggtcacaatgacttgcaggccagctcaagtgtaagtacatgcact
ggtaccagcagaagccaggatctctccccaacacctggattatgccccatcaaacctggcttctggagtcctgtcgttcagtg
gcagtggtgtctggacctctactctctcacaatcagcagagtgaggctgaagatgctgccacttattactgccagcagtggaattt
taaccaccacgtgtcgtctggaccagaagctggagctgaagaatggcgggtgctcggcggtgtggaictggaggaggtg
30 ggaagctctcaggcttatctacagcagctctggggtgagtcgtgaggcctggcgccagtgaaatgctcctcgaaggcttctggtc
acacatttaccagttacaatatgactgggtaagcagacacctagacaggcctggaatggattggagctatttatccaggaatg
45 gtgatactctcaatcagaagttcaaggcgaagccacactgactgtagacaatctccagcacagcctactgcagctcagc
agcctgacatctgaagactctgggtctatttctgtgcaagagtggtgtactatagtaactcttactgtactctgactgtctggcaca
gggacacgggtgacagctgtctcttctgacacgtctgtctccagggtactcaccggccaccgtggaatgacttactgtcgtcgcac
ggcgggggagctctcccccaccatccagctcctgtgctcgtctgtctgttggtacacccaggagactacaatcaccctgctgg
50 aggacgggcaaggtcatggagctggtgactgtccaccgctctaccacgaaggagggtgagctggcctccacaagaagcgaagctc
accctcagcagaagcactggtgtcagaccgacactcaccctgccaggtcactatcaaggtcacacctttgaggacagacca

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PT/US2003/041600

agaagtgctgacgattcaacccgagaggggctgagcgctacctaagccggcccaagcccgctgacgtgtcatccgcaagctgc
ccacgatacactgtctgtgtgacctggcaccagcaaggggaccgtgaacctgacctgtgtcccgccagctgtggagacgt
gtgaacacacacacaggaagggaggaagcagcgcaatggcagctgaacctgacgtccacacctgtccggtgggcaaccgag
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cagcgcccccgtgtgtcccccgaagctctatgctgttgacgacccgagtgctgggggagccgggacagcgaacacctgcc
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acgacgcagcccccagagaccaggggtccgctctctgtcttcagccgccctgagagtgaccagggccgaatgggagcagaa
agatgagttcatctgcccgtcagtcacatgagggcagcgagccctcacagaccgtccacgagcggtgtctgtaaatcccggtaaa
tgataatctaga

10 Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGSGGGSGGGSSQAYLQSSGAESVRPGASVKMSCK
15 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSADVFCARVYYNSNYWYFDVWGTGTTVTVDHVCSDRTF
PPTYKTLQSSCDGGGHFFPTIQLLCLVSGYTPGTINITWLEDGGVMDVLSATSTQ
EGELASTQSELILSQKHWSLDRITYTCQVITYQGHTFEDSTKKCADSNPRGVSAYLS
RPSFDFLRKSPITITCLVVDLAPSKGTVNLTWSRASGKPNVHSTRKEEYQNRNLT
20 VISTLPVGTDRWIEGETYQCRVTHPLPRALMRSTTKTSGPRAAPEVIAATPEW
PGSRDKRTLACLQNFMPEDISVQWLHNEVQLPDARHSTTPRKTGSGFFVFSRL
EVTRAWEWQKDEFICRAVHEAASPSQTVQRAVSVPNGK

16. 2H7 scFv VH L11S mlgE WCH2 WCH3 WCH4

25 Nucleotide sequence:
aagcttgcggccatgagatttcaagtgacagatttcaagcttctgctaatcagtgcttcagtcataatgtccagaggacaattgttct
cccagcttccagcaactctgtctgaatctccagggagaaagtgacacaaactgacttgcaggccagctcaagtgtaagttacatgaact
ggtagcagcagaagccaggaactcccccaaccctggalltatgcccacacacacacctggctgtgaggtccctgtcgtctcagtg
gcaatgggtctgggaccttactctctcacaatcagcagngtgtaggctgaagatgctgccacttattacgacagctgtgagatt
30 taaccacccacagttcgtgtcgtgggacaaagctggagctgaagatggcgggtgctcggcggtgtgtggaatcgaggaggggt
ggagctctcagcgttactacagcagcttggggctgagctgtgagggcctgggacctgaggaatgctctcgaaggcttctggct
acacattaccagttacaatgatcactgggtaangcagacacctagacaggcgctggaatggatggagctattatccaggaaatg
gtgatacttctacaatcagaagttcaaggcgaagccacactgactgtagacaatactccacagcagcctacatgcagctcagc
agcctgacatctgaagactctgggtctatttctgtcgaagagtggtgtactatagtaactcttactgctacitcgaatgtctggggcaca
35 gggaaccagggtagcgtctcttctgatcagcttgcacctgtcaacatactgagccacccttgagctactcattactctgcgacc
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gaatcagggcacgggtgtgattactactgatccaccacagccccctggacctgtataaaacgggtgtcccaaggcttactgt
40 ctgtgtggactgtgaagagcagaagaatgtcaatgtgacgtggaaaccaagagaagagactcagctcagactacccagatcccaatctgt
acataagcaccacataaacgccacaactagtatcaccttccatctcgtctgtatgttggccaaggactgtatgaaggctacgctatc
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gtgcagtggctggggatggcaactgatctcaaacagccaacagataccacaacacctgaaatccaatgtctccaatcaa
45 ggtcttctacttctcagtcgctgtaggtgcgaagacactctggacacagaaaacagttcaactgccaaatgtagtccatgagc
actcagaaaacccaggaaactggagaaaacaatatcacaaagcctgtgtaacacccctccctgcctcatctagatctagaag

50 Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGSGGGSGGGSSQAYLQSSGAESVRPGASVKMSCK

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PT/US2003/041600

ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSAVYFCARVYVYSNSYWFYEDVWGTGTTVTSSDHRVPNIT
EPTLELLHSSCDPNAFHSTIQLYCFYGHILNDVSVSWLMDREITDTLAQTVLKE
EGKLASTCSKLNITEQQWMSESTFTCKVTSQGVLYLAHTRRCPDHEPRGVITYLIP
5 PSLDLYQNGAPKLTCLVVDLESEKNVNVNTWNEKKTSTVSASQWYTKHHNNATT
SITSILPVVAKDWIEGYGYQCIVDHPDFPKPIVRSITKTPGQRSAPFVYVFPPEESEE
DKRTLCLIQNFPEDISVQWLGDGKLISNSQHSSTTPCLKSNSNGQFFIFSRLEVAK
TLWTQRKQFTQCVIHEALQKPRKLEKTISTSLGNTSLRPS

10 17. 2H7 scFv V H1 L1S hIgA WH WCH2 T4CH3

Nucleotide sequence:

aagcttgccgccatggaatttcaagtcgaattttcagcttctgctaatacagtgcttcagtcataattgccaggagacaattgttctt
ccagcttcacgaatctgtctgcatctcaggggagaaggtcacatgacttcaggggccagctcaagtglaagttacatgcact
ggtagacagcagangcagagctctccccaacccctggaattatgcccatccaaactggtctdggagtccctgtctgcttcagg
15 gcaptgggtctgggaccttactctctcaacaatcagcagagtgaggagctgaagatgctgccatttactgccagcagtgaggatt
taaccacccacagcttgcgtgctggaccaagctggagctgaagatggcgggtgctcggcggtggtgatctggaggaggtg
ggagctctcagcgttactacagcagctcgggctgagctctggagcctgggctcagtggaagatgctcgaagcctctgctgct
acacattaccagttacaatagcactgggtaaaagcagacacctagacagggcctggaatggatggagctatttatccaggaatg
gtgatactctcaacaatcagaatgccaaggcgaagccactgactgtagacaatactccagcacaacctacatgcagctcagc
20 agcctgacatctgaagactcggctctattctgcaagagtggtgtagtatacttactgtagcttactgtagcttgcgggcaca
gggaccacggctaccgtctcttctgatacagcagttccctcaactccactaccccatctcctcactccactccactccactccct
catgctgcccaccccgaactgcaatgcacggccctcaggacctgctcttaggttcagaaagcagtcacagtgacactg
accggcctgagagatgctcagctgctcaacttcaactggaacccctcaagtggaagagcgtgttcaggaccacctgaccgtg
acctctggctgctacagctgctcagctgctcggcgctgtgcccagccatggaacatcagggaaccttactgactgctg
25 gccaccccgaatccaaagaccgcctaacccgccacctctcaaaatccggaacacatctcgcccgaaggtccacctgctgcgc
ccgcctcggaggagctggccctgaacgagctggtgacgctgacgtgacctggcacgtggttcagccccaagatgctgctggt
cgtgctgctgaaggctcagcagagctgccccgcgagaagctacgtgctggcctcctccggcaggaagccagcagggcaca
ccacctcgtgctgacagcagcactgctgctggcagccgagactgggaagaaggggacaccttctgcatggtggggcagc
aggccctgcccgtgacctcacagaaaccatcgaacgctggcggtgaaacccacctgtaatgctgctgctcagtcggc
30 gagggtgactgataatctaga

Amino acid sequence:

MDFQVQIFSLFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSVSVMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSSYSLTSRVEAEDAATYYCQWWS
35 FNPPTFGAGTKLELKDGGSGSGGGSGGGSSQAYLQQSAGESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSAVYFCARVYVYSNSYWFYEDVWGTGTTVTSSDQVPVSPPT
PSPSTPTTSPSCCHPRLSLHRPALEDLLLGSEAILTCLTGLRDASGVFTFTWTPSSG
KSAVQGPDRDLDCGYSVSSVLPGAEPWNHGKTFCTTAAVYPSKTPLTATLSKS
40 GNTFRPEVHLLPPPSEELALNELVTLTCLARGSPKDVLRWLFQSGELPREKLYLT
WASRQEPSQGTTFITAVTILRVAEDWKKGDTFCMVGHEALPLAFTQKTDRLA
GKPTHVNVSVVMAEVD

45 18. 2H7 scFv V H1 L1S mIgA WH WCH2 T4 CH3

Nucleotide sequence:

aagcttgccgccatggaatttcaagtcgaattttcagcttctgctaatacagtgcttcagtcataattgccaggagacaattgttctt
ccagcttcacgaatctgtctgcatctcaggggagaaggtcacatgacttcaggggccagctcaagtglaagttacatgcact
ggtagacagcagangcagagctctccccaacccctggaattatgcccatccaaactggtctdggagtccctgtctgcttcagg
50 gcaptgggtctgggaccttactctctcaacaatcagcagagtgaggagctgaagatgctgccatttactgccagcagtgaggatt
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ggagctctcagcgttactacagcagctcgggctgagctctgaggcctgggctcagtggaagatgctctcgaagcctctggct

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acacattaccaggttacaataatgactgggtaagcagacacctagacaggcgctggaatggatggagctatttaccaggaaatg
gtgatctctctacaatcagaaggtcaaaggcagccacactgactgtagacaaatctccagcacagcctatcagcagctcagc
agcctgacatctgaagactctgggtctatttctgtgcaaggtggtgtactatagtaactcttactgttacttcgatgtctggggcaca
gggaccacgggtcaccgtctctctgatcacatctgtctctctactactctctcaccctctgccaagccagcctgtcactgca
5 cggccagcgtcttgaggcactgctcctgggttcagatgccagcatcacatgtactctgaatggcctgagagatcctgaggagctg
tcttcacctgggagccctcactgggaaggatgcagtcagaaagaaagctgtgcagaatctcctggcgtctacagtggttccagc
gtctgcctggctgtgctgagcgtggaacagtggtgcacatcattcaagtcacagttaccatctctgagctgacacctaactggc
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ctcgtgctcctgacatgctggtgagcgtttcaacctaaaagaagtgtgctggtgcagtggtgcaatggagaaatgaggagcttccc
10 agaaagctacctagtgttgagccctaaaggagccagggcagggagccacacacctacctgtgacaaagctgtgctgtgatac
gctgaaatctggaaacaggggtgaccagtaactctgcatggtggccacagggccttgcccataaacttaccagaagaccatcg
accgtctgtggcgtaaaccaccaatgtcagcgtgtctgtgatcatgtcagaggagattgataatctagat

Amino acid sequence:

15 MDFQVQIFSLFLISASVIIARGQIVLSQSPAILASAPGEKVTMTCRASSSVSYMHWY
QKPKGSSPKPWYAPNLSAGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTFTAGTGLLEKLDGGSGGGSGGGSSQAYLQQSGAESVRPAGSVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSS
TAYMQLSSLTISEDASVYFCARVVYYNSYWFYDVGWGTGTVTVSSDHCSPTTP
20 PPPSQPSLSLQRPALDLLLLGSDASITCTLNGLRDPEGAFTVWEPSTGKDAVQK
AVQNSCGCYSVSSVLPGCAERWNSGASFCKTVTHPESDTLTGITIAKVTVNTFPPQV
HLLPPSEELALNELVSLTCLVRAFPKPEVLVRWLHGNEELSPESYLVEFLKEPGE
GATTYLVTSVLRVSAEIKWQGDQYSCMVGHEALPMNFTQKLTIDRLSGKPTNVSVS
VIMSEG

A. mIgA WCH2 T4CH3

Nucleotide sequence:

Gtggatgacacatctgtctctctactactctctcacccttctgccagccagcgtctactgacagcggcagctctgagg
ctgctctctgggttcagatgccagcatcacatgtactctgaatggcctgagagatcctgaggagctgtcttaccctgggagccctc
30 cactggaaaggatgcagtcagaaagaagctgtgcagaattctgcggctgtacagtggtccagcgtctcctgcctgctgtgctg
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gtgaacaccttccaccgccaggtccactgctaccggcggcgtcggaggagctggccctgaatgagctcgtgtccctgacatgcc
tggctgcagcttcaacctaaagaagtgctgtgcgcatggcgtcagtggaatgaggagctgtccccagaaagctacctagtgttg
agccctaaaggagcaggcgaggagccaccactacctgtgtgacaagctgtgtgctgtatcagctgaaatctggaacagg
35 tggaccagtaactctgcatgtggggccacgaggccttgccatgaacttaccacagaagaccatcgaccgtctgtcgggtaaac
cacaatgtcagcgtgtctgtgatcatgtcagaggagattgataatctagat

Amino acid sequence:

20 DHICSPTTPPPSQPSLSLQRPALDLLLLGSDASITCTLNGLRDPEGAFTVWEPST
GKDAVQKAVQNSCGCYSVSSVLPGCAERWNSGASFCKTVTHPESDTLTGITIAKV
TVNTFPPQVHLLPPSEELALNELVSLTCLVRAFPKPEVLVRWLHGNEELSPESYL
VFEFLKEPGEATTYLVTSVLRVSAEIKWQGDQYSCMVGHEALPMNFTQKLTIDRL
SGKPTNVSVSVIMSEG

20. K322S CH2 region

Nucleotide sequence:

ctgaaactctgggggacgtgactcttctcttcccccaaaacccaggaacacctcatgatctcccgagccctgaggtcac
atgcgtggtgggtgacgtgagccacgaagaccctgaggtcaagttcaactgtgacgtggacggcggtggaggtgataatgccaa
gacaaagcccgaggagcagtcacacagcagctaccgtgtgtgctagcgtctcaccgtctgacacagcagctgctggaatg
50 gcaaggagtacaagtgctcgtgtcctcaacaaagccctccagcccatcgagaaacaatctccaagacaaa

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PCT/US2003/041600

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAIEKTISKAK

5

21. K322S CH2 WCH3

Nucleotide sequence:

ccctgaactctctgggggaccgtgactgtctctctcccccacaaacccaaggacaccctcatgatctccggaccctgaggtcac
atgcgtgtggtggacgtgagccacgaagaccctgaggtcaagttcaactgtgacgtggacggcgtggaggtgcatatgcaaa
gacaaagccgcggggagagcagtacaacagcacgtaccgtgtgtgacgcgtctcaccgtctgcaccaggaactggctgaatg
cgaaggagtlacaaggtctcgtcgtcctccaagaagccctccacgcccccatcgagaaaaaatctccaagccaaaggcgagccc
cgagaaccacaggtgtacaccctgcccccatccgggatgagctgaccaagaccagggtcagcctgacctgctggcttcaaaagg
cttctatccacgcgacatcggcgtggagtgaggagcgaatggggcagccggagacaactacaagaccacgcctccgtctgctgg
actccagcggctcctctctctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgctcctgtg
atgcatgaggctctgcacacactacacgcagagagcctctcctctgctccgggtaaatgatctaga

15

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPV
LDSGDSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSLSPGK

20

1. K322L CH2 WCH3

Nucleotide sequence:

tgatcaggagcccaaatctcttgacaaaactcacacatccccaccgtctcagcacctgaaactctgggggaccgtcagcttctct
cttccccccaaaacccaaggacaccctcatgatctccggaccctgaggtcacatgcgtgtgtgtggacgtgagccacgaaga
ccctgaggtcaggttcaactgtgacgtggcggcgtggaggtgcataatgccaagacaagccggcgaggagcagcacaaca
cagctgaccgtgtgtgtcagcgtctcaccgtctcgcacacaggactggctgaatggcaaggatcaagtcctgtctccaaca
agccctccacgctccccatcgagaaaaaatctccaagcgaaggcgagcccgagaaaccagaggtgtacacctgcccccat
ccgggatgagctgaccaagaacacaggctcagcctgacctgctgtcaaaaggcttctatccagcgacatcgccgtggagtggtg
agagcaatggcgagccgggagaaactacaagaccacgcctcccgctgtggaactccgacggctcctcttctctcagacaagct
caccgtggacaagagcaggtggcgacaggggaacgtcttctcatgctccgtgatgatgaggtctgcacacactacacgca
gaagagcctctcctgtctccgggtaaatgatctaga

25

30

Amino acid sequence:

DQEPKSSDKTHTSPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHED
PEVKFNWYVDGVEVHNAAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCLV
SNKALPAIEKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVE
WESNGQPENNYKTTTPVLDSGDSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHN
HYTQKSLSLSPGK

40

22. 2H7 scFv VHL11S hIgG1 (SSS-S)H K322SCH2 WCH3

Nucleotide sequence:

aagcttgccgcctatggattttcaagtcgacatttcagcttctcgtatcatcagtgcttcacgtatgaattgccagaggacaaatgttctct
ccagcttcacgaactctgtctgctatccaggaggagaggtcacatgacttcaggggccagctcaaggtgaagtacatgcact
ggtaccagcagaaggccaggtactctcccccaaaccttgatttatgcccccaaacctggcttctggagctcgtctgctcagtg
gcagtggtgttggaaccttactctctcacaatcagcagatggaggctgaagatgctgccaattatctatgccagcagtgagttt
taaccacaccacgttcgggtgtcgggaccaagctggagctgaagaatggcgggtggctcggggcgtggtgtgacttggaggaggtg
ggagctctcaggtctatctacagcagctctggggctgagtcgggtgagcctggggcctcagtgaaatgtctcgaaggcttctggc
tacaattttaccgtatacatatgactgggtanaagacacactgacagggcctggaatggattgagctatttatccaggaat
ggtgatactctacaatcagaagattcaagggaaggccaacactgactgtgacacaaatcctcagcagagctcactatgcagctcag

50

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PT/US2003/041600

cagcctgacatctgaagactctgcggtctattctgtcgaagagtggtgtactatagtaactcttacttggtactctgatgtctggggcac
aggggacacggtcagcgtctctctctcccccaaaacccaaggaacccctcatgaltcccggaacccctgaggtcacatgcgtgg
ctggggggacgcgtcagcttctctctcccccaaaacccaaggaacccctcatgaltcccggaacccctgaggtcacatgcgtgg
tgggtgacgtgagccacgaagaccctgaggtcaagttcaactgtgacgtgagcggcggtggaggtgcaatgccaagacaagc
cgcggggagagcaggtacaaacagcagctaccgtgtggcagcgtctcaccgtctcaccagagactggctgaatggcgaagag
tacaagtgctcgtgtcccaaaaagccctccagccccatcgagaaaacaaatctcctcaagccaaaggcgagccccgagaacca
caggtgtacacccctgccccatcccggtgagctgaccaagaacacaggtgacgctgacgtcctgctgcaaaagccttcatacca
ggacacatcgccgtgagtgaggagcaatggcgagccgggaacaaactacaagacacgcccctccgtctgagcactgacgg
ctcctctctctctacagcaagctcaccgtggacagagcaggtggcagcaggggaacgtctctcatgctcgtgatgcatgagg
ctctgcacaacactacacgcagaagagcctctcctgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSLILASVVIARGQIVLSQSPAILASAPGKEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYIAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGATLTVDKSSS
TAYMQLSLSTSDSAVYFCARVYYNSYWFYDVGWGTGTTVTSSDEPKSSDK
THTSPSSAPPELLGPGSVFLFPPKPKDILMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVVEHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCSMHEALHNHYTQKSLSLS
PGK

23. 2H7 scFv VHL11S hIgG1 (SSS-S)H K322L.CH2 WCH3

Nucleotide sequence:

aagctgcccgcattgatttcaagtcgagattttcagctctcctaactcagtgcttcagtcataatgagcaggacaaattgtctct
ccagctgtccagcaactcctgtctcgtctccaggggagaaagtcagactgacgtgcagggccagcctcaagtgtaaagtacatgcact
gttacacagcagaagccagatcctcccccaaacctggattatgccccatcaacatgctgttggatcctctgctcgttcagtg
gcagtggtgttgggacctcttactctctcaaatcagcagagtgaggcgtgaagatgctgccattattatgccagcagtgaggatt
taaccacaccacgtgttcgtctgggaccaagctggagctgaaagatggcggfgtcgtggcggtgtgtgagatcggagggagtg
ggagctctcagccttatctacagcagctcggggtgagtcgggtgagcctggggcctcagtgagaatgtctctcagggctctggc
tacacattacaggttacaatgatcagctgggttaaagcagacactagacagggcctggaagtggagtgagcttattacaggaat
ggtgalacttctctacacagaaagttcaaggcgaaggccacactgactgtagacaaatcctccagcacagcctcatcagcgtcag
cagcctgacatctgaagactctcgggtctattctgtcgaagagtggtgtactatagtaactcttacttggtactctgatgtctggggcac
aggggaccacggtcaccgtctctctgatcagggcccaaatctctgacaaaactcacacatccccaccgtctcagcagcctgaact
ctggggggaccgtcagctctctcctcccccaaaacccaaggaacccctcatgaltcccggaacccctgaggtcacatgcgtgg
tgggtgacgtgagccacgaagaccctgaggtcaagttcaactgtgacgtgagcggcggtggaggtgcaatgccaagacaagc
cgcggggagagcgttacaaacagcagctacgtgtggcagcgtctcaccgtctcagcaggagctggctgaatggcgaagag
tacaagtgctcgtgtctcacaagaacccctccagccccatcgagaaaacaaatctcacaagccaaaggcgagccccgagaacca
caggtgtacacccctgccccatcccggtgagctgaccaagaacacaggtgacgtcgtcgtcgaaggtcttatacca
ggcagatcgcgtggagtgaggagcaatgggcagcgggagaacaaactacaagaccacgctcctcgtcgtgagctcagcagc
ctcctctctctcagcagcagctcagcgtgacaaagagcaggtggcagcaggggaacgtctctcatgctcgtgatgcatgagg
ctctgcacaacactacacgcagaagagcctctcctcgtctccgggtaaatgatctaga

Amino acid sequence:

MDFQVQIFSLILASVVIARGQIVLSQSPAILASAPGKEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYIAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYYCQQWS
FNPTTFGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGATLTVDKSSS
TAYMQLSLSTSDSAVYFCARVYYNSYWFYDVGWGTGTTVTSSDEPKSSDK

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THTSPSSAPELGGPSVFLFPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCLVSNKALPAPIE
KITISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLS
5 PGK

24. 2H7 scFv VHL11S hIgG1 (CSS-S)H K322SCH2 WCH3

Nucleotide sequence:

aagcttgccgccatggaatttcaagtcgacatttcagcttctcgttaatcagtgcttcagtcataattgccagaggacaaattgttctt
cccagctctccagcaatctgtctgcatctccaggggagaaggcacaatgactgcagggccagctcaagtgaattacatgcaat
10 ggtaccagcagaaagccagatctcccccacaaccttgattatgcccatcaacctgctcttgaggctcctgctcgttcagtg
gcagtggtgctgggacctcttactcttcacaaatgcagagatggaggctgaagatgctgccatttactgccagcagtgagggtt
taacccacccagcttggtgctgggaccaaagctgagctgaagatggcgggctggcggtgctggatctggaggaggtg
ggagctctcaggcttatctacagcagcttggggctgagtcggtgagccctggggcctcagtggaagatgctcgcgaaggctctggc
15 tacacattaccagttacaatgatcactgggtgaaagcagacacctagacaggcctggaatgattggagctatttaccaggaat
ggtgatactctcacaatcagaagtcaaggccaaaggccacactgactgtagacaaatctccagcacagcctacatgcagctcag
cagctgacatctgaagactctgcgtctatttctgtgcaagagtgctgtaactatgtaactcttactgtgctctgagctctggggcac
agggacacagcgtgcaccgltcttctgatcagggagcccaaatctgtgacaaaactcacatccccaccgctctcagcaccctgaact
cctggggggagccgtcagcttctcttccccccaaaaccaaaggacacctcatgatctccggaccctgagctcacatgcgtgg
20 tgggtgacgtgagccacgaagacctgaggtcaagttcaactggtacgtggagcgcgtgaggtgcataatgccagacaaagg
cgcgggagagacagtlacacagcacgtlaccgtgtgtgacagctcctcaccgctcaccagagagctgctgaatggcgaaggag
tacaagtgctcgtgtcccaaaagccctccagccccatcgagaaaacaaatccaaaggcagccccgagaacca
caggtgtacacctgcccccatccgggatgagctgaccaaagacaggcagcctgacctgctggtcgaaggcttctatccca
gcccagatcgcgtggagtgaggagcaaatggcgagccgggagaaactaacaaagaccagcctccgtgctgagctccgacgg
25 ctccttctctctacagcaagctaccgtggacaagagcagcaggtggcagcaggggaacgtcttctcatgctccgtgatgatcagg
ctctcgaaccactacacagagaagcctctcctgctccgggtaattgatcaga

Amino acid sequence:

MDFQVQIFSLLISASVIIARGQIVLSQSPAILASASPGKEVTMTCRASSSVSYMHWY
30 QKQKPGSSPKPWYAPSNLASGVPARFSGSGSSTYSLSIRVEAEDAATYYCQQWS
FNPTFGAGTKLELKDGGSGGGGGSGGSSQAYLQQSQAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPGNGDTSYNQKFGTKVATLTVDKSSS
TAYMQLSSLSEDSASVYFCARVYYNSNSYWFYFDVWGTGTTTGTVSSDQEPKSCDK
THTSPSSAPELGGPSVFLFPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNWYV
35 DGVVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCSVSNKALPAPIE
KITISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLS
PGK

25. P331S CH2

Nucleotide sequence:

cctgaactctgggggagcgtcagctctctcttcccccaaaaccagggacacctcatgatctccggaccctcagggtcac
atgctggtggtggagctggagccacgaagacctgaggtcaagttcaactgtacgtggacggcgtgagggtgcaatgccaa
gacaaagccgcgggagagcagctacaaacagcacgtaccgtgtgtcagcgtctcaccgctcgcaccaggaactgctgaatg
45 gcaaggagtacaagtgcgaaggtctcccaaaagccctccagcctcatcgagaaaacaaatccaaaggccaaa

Amino acid sequence

PELLGGPSVFLFPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKITISKAK

26. P331S CH2 WCH3

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PCT/US2003/041600

Nucleotide sequence:

5 cctgaacctcctgggggacctgcagtcttctcttccccccaaaccgaagacacctcatgatctccgggacacctgagggtcac
atgcgtggtggtggacgtgagccacgaagacctgaggtaagtcaactgtgacgtggacggcgtggaggtgcataatgccaa
gacaagaagccggggagggagcagtaacaacgacgtaccgtgtgtgacgctctccacgtcctgaccaggactggtgatg
gcaagggtgtacaaagtcaaggtctccaacaagccctccagcctccatcgaagaacaactctcaaaagccaaagggcagccc
cgagaacacagaggtgtacacctgccccatccccgggatgagctgaccaagaccaggctgacctgacctgctgtctcaagg
cttctatccagcgacatcgccgtggagtgaggagacatggcgccggagaaactacaagaccacgctcccggtgctgtg
actccgacggctctcttctctctacagaagctaccgtggacaagagcaggtggcagcaggggagacgtcttctcatgctccgtg
atgatgaggctctgcacaaacctactacgcagaagagcctctcctgtctccgggtaaatgatctaga

Amino acid sequence

10 PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPV
15 LDDSGSFFLYSKLTVDKSRWQQGNVFSVSMHEALHNHYTKQSLSPGK

27. 2H7 scFv VH L11S (SSS-S)H P331S CH2 WCH3

Nucleotide sequence:

20 aaggttgcgccatgatttcaagtgcagattttagcttctctgtaatacagtgcttcagtcataattgccaggacaaaattgttctct
cccagctctccagcaactctgtctgcaltccaggggagaaagtcacaatgactgcaggccagctcaagtgttaagtattacatgcact
ggtaccagcagaagccagagctctcccccacacccctggalttatgcccatccaactgcttctggaggtccctgtcgtcttcagtg
gcaagtgggtctctgggaccttctactctcacaatcagcagagtggaaggtgaagatgctgccacttattactgccacagtcgtgagttt
taaccuacaccacgttctggtgtgctggaccaaagctggaagctgaaagatggcgggtgctcggcggtgtgagctggagagagtg
ggngctctcaggtattatcacagcagcttggggctgagtgctgaggcctggggcctcagtgaaagatgctctcaaggcttctggtc
25 tacacatttaccaggttacaatatgcactgggttaagcagacactagacagggcctggaaaggattggagctatttaccaggaaal
ggtgatacttctacaatcagaagtcaaggcgcaaggccacactgactgtagacaactctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcggtctatttctgtcgaagagtggtgtgactatagtaactcttaactggcttctgaltgtctggggcac
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30 tgggtgacgtgagccacgaagacctgagggtcaaggttcaactggtgactggagcggcgtggaggtgataatggccagacanaagc
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caggtgtacacctgccccatccccgggatgagctgaccaagaacacgtagcctgactgctggttcaaggctcttattcca
gcgacatcgccgtgaggtggagagacatgggcagccggagacaactacaagaccacgctccgctgctggactcgcaggg
35 ctctcttctctctacagaagctcaccgtggacaagagcaggtggcagcaggggagacgtcttctcatgctcgtgatgatgagg
ctctgcacaacctactacgcagaagagcctctcctgtctccgggtaaatgatctaga

Amino acid sequence

40 MDFQVQIFSFLIASVHIARGQIVLSQSPAILSASPGEKVTMTCRASSVSYMHWY
QQKPGSSSPKPIWYAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYVCQQWS
FNPTPTGAGTKLELKDGGGSGGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYFTTYSNMHWVKQTPRQGLEWIGAIYPGNQDTSYNQKFKGKATLTVDDKSS
TAYMQLSSLTSEDSAVYFCARVYVYNSYWFYFDVWGTGTTTVSSDQEPKSSDK
THTSPSPSAPPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVY
45 DGEVEHNAAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSVSMHEALHNHYTKQSLSPGK

28. 2H7 scFv VH L11S (CSS-S)H P331S CH2 WCH3

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PCT/US2003/041600

Nucleotide sequence:

aagcttgcgcgcattgattcaagtgcagattttcagcttctgctaalcagtgcttcagtcataattgccagaggacaaaattgttctct
cccagctctccagcaatctctgtctgcaicccaggggagaaagctcacaatgacttcaggggcagctcaagtgtaagttaacatgcact
ggtaaccagcagaagcggagcactctcccccaaacctcggatttatgcccatccaacctggctctctggagtcctctgctcgttcagtg
5 gcaagtggctctgggagctctctctcacaatcagcagagtgagggtgaagatgctgccacttattatgccagcagtgaggatt
taaccaccacggttcgggtgctgggaccanctggagctgaagatggcgggtggctcggcggtggatctggaggagtg
ggagctctcagggttatclacagcagctctggggctgagtcgggagggcctcagfagaagatgctcgcgaaggctctggc
taccactttaccagttacaatatgcactggglaagcagacacctagacaggggcctggaatggattggagctattatccaggaaat
gggtatacttctacatcagaagttcaaggggcagggccacactgactctagacaaaatctccagcacagcctacatgcagctcag
10 cagcctgacatctgaagacgtcgggtctatttctgtgcaagagtggtgctactatagtaacttacttggtactctgctgctgggac
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15 tacaagtgcgaaggctctcaacaaagccctccagcctccatcgagaaaacaatctcaaaagccaaaggcagccccgagaacca
cagggtgtacacctgccccatcccggtgatgctgaccaagaacaggctcagcctgactcgtcgtgctcaagaggttctatcca
ggcagatcggcgtggagtgaggagacaaatgggcagccggagaacaaclacaagacacgcctccgtgctgcacatccgcaggg
ctctcttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctctatgctcctgtagatgagg
20 ctctgcacaaccactacagcagaagagcctctcctgctccggtaatgatctaga

Amino acid sequence

MDFQVQIFSLLISASVVIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYIAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYVCQWS
FNPTFTGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
25 ASGYFTSYNMHWVVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKALTIVDKSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFVDVWGTGTITVTVSSDQEPKSCDK
THTSPSSAPPELLGSGSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPASTE
KITISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
30 NYKTTTPVLVDSGFFLYSKLTVDKSRWQQGNVFSQSMHEALHNHYTQKSLSLS
PGK

29. T256N CH2 region

Nucleotide sequence:

35 Cctgaactctctgggggacgctcagctctctctctcccccaaaacccaaaggacacctcatgatctccggaaacctgagggtca
catcgtggtggtggtgacgtgagccacgaagacctgagggtcaagttcaactggtacgtggagcggcgtggagggtgataatgcca
agacaaagccggggagagcaggtacacagcagctaccgtgtggctcagcgtctccaccgtctgcaccaggagctgctgaat
ggcgaaggagtagcaagtgaaggtctccaacaaagccctccagcccccatcagaaaacaatctccaaagccaaa

Amino acid sequence

40 PELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAIEKTISKAK

30. T256N CH2 WCH3

Nucleotide sequence:

45 cctgaactctctgggggacgctcagctctctctctcccccaaaacccaaaggacacctcatgatctccggaaacctgagggtca
atgctggtggtggtgacgtgagccacgaagacctgagggtcaagttcaactggtacgtggagcggcgtggagggtgataatgcca
agacaaagccggggagagcaggtacacagcagctaccgtgtggctcagcgtctccaccgtctgcaccaggagctgctgaatg
gcaaggagtagcaagtgaaggtctccaacaaagccctccagcccccatcagaaaacaatctccaaagccaaagggcagccc
50 cgaagaaccacaggtgtacacacctgccccatcccggatgagctgaccaagaacaggtcagcgtgactgctcgtgtcaaaag
cttctatccaggcagatcggcgtggagtgaggagacaaatgggcagccggagaacaactacaagaccacgctccctgctggtg

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actccgacggctctcttctctctacagcaagctcaccgtggacaaagcagcaggtggcagcaggcggaacgtctctcatgtccgtg
atgcatgaggctctgcacaaacctacacgcagaaagacgtctctccctgtctccgggtaaatgatctaga

Amino acid sequence

5 PELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTKISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSGGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNNHYTQKSLSLSPGK

10 31. 2H7 scFv VH L11S (SSS-S)H T256N CH2 WCH3

Nucleotide sequence:

aagcttgcgcgcattgatttcaagtcgagattttcagcttctctctaatacagtcgttcacgtcctaataatgccagaggacaaattgttctct
ccagctctccagcaatcctgtctgtcctcctccaggggagaaagtcacaaatgacttcagggccagctcaagtglaagtatcatgcaact
15 ggtaccacagcagaagccagatctccccaaacctggattatgcccatcacaacctggtcttggagtcctctgctcgttcagtg
gcagtggtgtctgggaccttactctctcacaatcagcagagtgaggctgaagatgctgccattatcagccagcagtggtgatt
taaccacccacgttcgtgctgggaccaagctggagctgaagatggcggctgctcgccggctgggagctggagggagggtg
ggagctctcagcgttatctacagcagctctgggctgagtcggtgaggcctggggcctcagtgaaagatgctcgaagcctctggc
20 tacacattaccagttacaataatgcactgggtaagcagacacactagacaggcctggaatggatggagcattatccaggnaat
gggtatcttccataacatcagaagttcaaggcgcaagccacactgactgttagacaatactccagcagacgctcatcagcagctcag
cagcctgacatctgaagactctgcggctctattctgtgcaagagtgctgtactatagtaactcttactggtaacttcgatctctgggac
agggcacacggtcacctgtcctctctgtatcagcagcgaacatctctgacanaactcacacatccccacgtctcagcagctgaact
25 cctgggggagcgtcagctgtctctctcccccacaaacccaaggacacccctatgactctccggaacctgagcagctcagctgctg
tgtgtgacgtgagccacgaagaccctgagtgctcaagtcaactggtacgtggcagggcgtggaggtgcatatgccaagacacaaagc
cgcggggagcagcagctacacagcagcagctaccgtgtggcagcgtctcaccgtctgccaccaggaactggctgaatggcgaagag
tacaagtcgaaggcttccacaaagccctccagccctcagcagaaacacatctccaaagccaaaggcgagccccgagaac
30 acaggtgacacccctcccccactccgggatgagctgaccaagaaccagctcagcctgacctgctgcaaggtcttatatccc
agcgacatccctggaggtggagagcaatggcgagccgggagaacactacaagaccacgctccctgctggaactcgaagc
gtctcttctctctacagcaagcgtcaccgtggcagaagcaggtggcagcagggggaactgtctctatgctccgtgatgcatgag
gtctgcacaacactacacgcagaagagcctctctctgtctccgggtaaatgatctaga

Amino acid sequence

MDFQVQIFSLFLISASVVIARGQIVLSQSPAILSASPGKEVMTTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTYSYSLTISRVEAEDAATYYCQQWS
35 FNPPTFGAGTKLELKDGGSGGGGSGGGGSSQAYLQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVWKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSDSDAVYFCARVYVYNSYWFVDVWGTTVTTVSSDQEPKSSDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISRNPEVTCVVVDVSHEDPEVKFNWY
VDGVEVIHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
40 EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTPPVLDSDGGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNNHYTQKSLSL
SPGK

45 32. 2H7 scFv VH L11S (CSS-S)H T256N CH2 WCH3

Nucleotide sequence:

aagcttgcgcgcattgatttcaagtcgagattttcagcttctctctaatacagtcgttcacgtcctaataatgccagaggacaaattgttctct
ccagctctccagcaatcctgtctgtcctcctccaggggagaaagtcacaaatgacttcagggccagctcaagtglaagtatcatgcaact
50 ggtaccacagcagaagccagatctccccaaacctggattatgcccatcacaacctggtcttggagtcctctgctcgttcagtg
gcagtggtgtctgggaccttactctctcacaatcagcagagtgaggctgaagatgctgccattatcagccagcagtggtgatt
taaccacccacgttcgtgctgggaccagcgtggagctgaagatggcggctgctcggcggtgctggtgagctggagggaggtg

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ggagctctcaggcttatctacagcagctcggggctgagtcggtaggcctggggcctcagtgagaatgctctcgaagccttcggc
tacacatttaccagttacaataatgcactgggtaaacgagcacctlagacaggccctggaatggatggagctattttaccaggaat
tggtatacttctacaatcagaagttcaagggaagccacactgactgtagacaaatctccagcacagcctacatgcagctcag
cagcctgacatctgaagactctgcgtctatttctgtgcaagagtggtgactatagtaacletctactgtaacttcgatgctcggggac
agggaccacggctaccgctctcttctgacaggagccaaatcttggacaaaactcacacatcccccactcctcagcactgtaact
cctggggggagccgtgactctctcttcccccaaaacccaaggacacccctcatgatctccgggaacccctgagggtcacatgcgtgg
tgttgtagctgagccaggaagccctgaggtcaagttcaactggtagctgagccggcgtgagggtgcaataatgcgaagacaagaag
cggcgggggagcaggtacacagcagctaccgtgtgtgtagcgtctctacccgtctcaccagcagctgctgaatgggcaaggag
tacaagtgcaaggtctcacaagaagccctccagcccccacgagaaaacaaatctccaaagccaaaggcgagcccgagaacc
acaggtgtacacccctgcccccacccggatgagctgaccaagaaccaggtagcctgaactgcctgggtcaaaaggcttactccc
agcgacactgcctgtggaagtgggagagcaatgggcagccggagaacaactacaagaccacgctcccggtgctgactccgacg
gtctcttctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtcttctcatgtctcctgatgatgag
gctctgcacaacactacagcagaagacctctccctgtctccgggtaaatgatctaga

15 Amino acid sequence
MDFQVQIFSFLISASVIIARGQIVLSQSPAILASAPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYIAPSNLASGVPARFSGSGSTSYSLTISRVEAEDAATYTCQQWS
FNPTPTGAGTKLELKDGGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQFKGKATLTVDKSSS
20 TAYMQLSLSTSEDSAVYFCARVYYNSNSYWFYFDVWGTGTTVTIVSSDQEPKSCDK
THTSPSPSAPPELLGGPSVFLFPPKPKDTLMISRNPEVTCVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTTPVLDSGFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLSL
25 SPGK

33. RTPE/QNAK (255-258) CH2

Nucleotide sequence:

30 cctgaactctcgggggaccgtcagttctctcttcccccaaaacccaaggacacccctcatgatctccagaacgtgaaggtcac
atgcgtgtgtgtgagctgagccacgaagaccctgaggtcaagttcaactggtagctggacggcgtggaaggtgcaataatgccaa
gacaaagccgcgggaggagcagtaacaacgacgtaccgtgtgtgtagcgtctctcaccgtctcctgacacgaagctggtgaatg
gcaaggagtaacagtgcaaggtctocacaaaagccctccagcccccacgagaaaacaaatctccaaagccaaa

Amino acid sequence

35 PELLGGPSVFLFPPKPKDTLMISQNAKVTCVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK

34. RTPE/QNAK (255-258)CH2 WCH3

Nucleotide sequence:

40 cctgaactctgggggaccgtcagttctctcttcccccaaaacccaaggacacccctcatgatctccagaacgtgaaggtcac
atgcgtgtgtgtgagctgagccacgaagaccctgaggtcaagttcaactgttagctgtagcggcgtggaggtgcaataatgccaa
gacaaagccgcgggaggagcagtaacaacgacgtaccgtgtgtgtagcgtctcaccgtctgacacgaagctggtggaatg
gcaaggagtaacagtgcaaggtctcacaagaagccctccagcccccacgagaaaacaaatctccaaagccaaaggcagccc
cgagaaccacaggtgtacacctgcgcccccacccggatgagctgaccaagaacaggtgacgtgactgctggttcaaaagg
45 ctctatccagcgcacatcgccgtggagtgaggagacgaatggcagccggagaacaactacaagacacgcctccctggtg
actccgagcgtctctctctacagcaagctcaccgtggacaaagcaggtggcagcaggggaacgtcttctcatgtctcgtg
atgcatgaggtctgcacaaactacacgcagaagacctctcctgtctcctgggtaaatgatctaga

Amino acid sequence

50 PELLGGPSVFLFPPKPKDTLMISQNAKVTCVVDVSHEDPEVKFNWYVDGVEVHN
AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG

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QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTPPV
LDSGGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNNHYTQKSLSPGK

35. 2H7 scFv VH L11S (SSS-S)H RTPE/QNAK (255-258)CH2 WCH3

Nucleotide sequence:

aaagctgcccgcattggaatttcaagtcagattttcagcttctgctaatacagtcgttcacgtacgtacataattgccagaggacaattgttctct
ccagctctccagcaatcgtgtcgtcctccaggggaggaaggtcacaatgacttcagggccagctcaagtgtaagtttacctgcaat
ggtaccagcagaagccaggaatcccccacaacctggalltatcccccaacacctggctctggagtcctcgtcgttcacgtg
gcatggtggtctgggaccttacctctcacaatcagcagagtgtagggctgaagatgctgccatttacctgccagcagtgaggatt
taaccacccacgttgcgtgctgggaccaagctggagctgaagatggcgggtgctggcggtggtggtgctgtaggagagtg
ggagctctcaggcttatctacagcagctcggggtgagtcggtagggcctgggctcagtggaagatgctcgaaggctctggc
tacatttaccagttacaatgatcactggtaagcagacacctagacaggcctggaatggattggagctatttaccaggaaat
ggtgatactctcaacatcagaagttcaaggccaaggccacactgactgtagacaaatctccagcacagctacatgcagctcag
cagctgacatctgaagactctcgggtctatttctgtcgaagagtggtgtactatagtaactcttactgglaattcgatgtctggggcag
aggggaccacggctacgctctctgtatcaggagcccaaatctctgacaaaactcacatccccaccgtctcagcagcctgaact
ctggggggaccctgacgtcttctcttcccccaaaacccaaggacacccctcatgaltccagacagcgtcaaggttcacatgctggg
tggtggactgtagggcacgaagacccctgaggtcaagttcaactgtacgtggacggcgtggtagggtgataatggccaagacaagc
cggcgggagggagcagttacacagcagctacgtgtgtggcagcgtcctaccgtctgccaccaggactggtgaatggcaaggag
taagagtcgaaggtctccaaanaagccctccagcccccagagaaacaaatctccaaagccaaggcgagccccgagaacc
acaggtgtacacacctgcccccacccgggagtgagctgaccaagaaccaggctcagcctgactgctgcaagggctctatccc
agcagacatgcgcgtggagtggtggagagcaatgggcagccgggagaaacacacacagacacacgctccctgctgctggaactcagc
gtcctctctctctacagacagctcaccgtggacaagagcaggtggcagcaggggaacgtctctatgctcgtgfatgcatgag
gctgtcacacacactacacagcagaagccctcctgtctcgggtaaatgatctaga

Amino acid sequence

MDFQVQIFSLFISASVIIARGQIVLSQSPAILASASPGKEVTMTCRASSVSYMHWY
QQKPGSSSPKPWYAPRNLASGVPARFSGSGSGTSYSLTISRVEAEDAATY YCQQWS
FNPTTFGAGTKLELKDGGGSGGGGSGGGGSGQAYLQQS GAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGGDTSYNQKFKGKATLVVDKSSS
30 TAYMQLSSLTSEDSAVYFCARVYYYSNSYWFYDFVWGTTVTYVSSDQEPKSSDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISQNAKVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
35 NNYKTTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNNHYTQKSLSL
SPGK

36. 2H7 scFv VH L11S (CSS-S)H RTPE/QNAK (255-258)CH2 WCH3

Nucleotide sequence:

aaagctgcccgcattggaatttcaagtcagattttcagcttctgctaatacagtcgttcacgtacgtacataattgccagaggacaattgttctct
ccagctctccagcaatcgtgtcgtcctccaggggaggaaggtcacaatgacttcagggccagctcaagtgtaagtttacctgcaat
ggtaccagcagaagccaggaatcccccacaacctggalltatcccccaacacctggctctggagtcctcgtcgttcacgtg
gcatggtggtctgggaccttacctctcacaatcagcagagtgtagggctgaagatgctgccacttattactccagcagtgtagatt
taaccacccacgttcgtgctgggaccaagctggagctgaagatggcgtgctcggcggtggtggtgctgtaggaggtgag
45 ggagctctcaggcttatctacagcagctcgggctgagtcgtgtagggcctgggctcagtggaagatgctcgaaggctctgtggc
tacatttaccagttacaatgatcactggtaagcagacacctagacagggcctggaatggattggagctatttaccaggaaat
ggtgatactctcaacatcagaattcaaggccaaggccacactgactgtagacaaatctccagcagacactacatcagctcag
cagcgtctcagctgaagactctcgggtctatttctgtcgaagagtggtgtactatagtaactcttactgctgtagtctcgggac
agggacacggtaaccgtctcttctgacaggagcccaaatctgtgacaaaactcacatccccaccgtctcagcagcctgaact
50 cctggggggagcctgacgtcttctctcccccaaaacccaaggacacccctcatgaltccagacagcctcagatgcatatgctg
tggtggactgtaggcacgaagacccctgaggtcaagttcaactggtagtgagcggctggaggtgataatggccaagacaagc

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cgcggaggagcagtcacaacgacgacgaccgtgtggcagcgtctcaccgtctcgcaccaggactggctgaatggcgaaggag
tacaaggcgcaagggtctcacaacaaagccctccagcccccacgcagaaacaatccaaagcgaaggcagccccgagaacc
acagggtgacacacctgcccccaccggatgagctgaccaagaacacggcagcctgacctggctgcacaaaggcttctatccc
agcgacatcgccgggtggaggagcaatgggcagccggagaaacactacaagaccgcctccgctgctgagctccgacg
gctctctctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctatctctcgtcgtgatcgatgag
gctctgcacaacactacacgcagaaagacctctcctgctctcgggtaaatgatctaga

Amino acid sequence

MDFQVQIFSLLSASVIIARGQIVLSQSPAILASAPGKEVMTMTCRASSVSVMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPTFGAGTKLELKDGGSGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDASVYTCARVYYNSYWFYFDVWGTGTTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISQNAKVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
NNYKTTTPVLDSGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSLSLSPGK

36. K290Q CH2 region

Nucleotide sequence:

cctgaactcctgggggaccgtcagctctctctcccccacaaacccaaggacacctcatgatctccggaccctgaggtcac
atgcgtgggtggagcgtgagccacgaagacctgaggtcaagttaacctgtacgtggagcggcgtgaggtgcataatgccaa
gacacagccgcggggaggagcagtcacaacgacgtaccgtgtgtcagcgtctcaccgtctcgcaccaggactggctgaatg
gcaaggagtcacaagtgcaaggtctccacaanaagccctccagcccccacgcagaaacaatctcacaagcaca

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK

37. K290Q CH2 WCH3

Nucleotide sequence:

Cctgaactcctgggggaccgtcagctctctctcccccacaaacccaaggacacctcatgatctccggaccctgaggtca
catcgtgtgtggagcgtgagccacgaagacctgaggtcaagttaacctgtacgtggagcggcgtgaggtgcataatgccaa
agacacagccgcggggaggagcagtcacaacgacgtaccgtgtgtcagcgtctcaccgtctcgcaccaggactggctgaat
ggcaaggagtcacaaggtcaggtctccacaanaagccctccagcccccacgcagaaacaatctcacaagcacaaggcagcc
cggagaaccacaggtgtacacctgcccccacccgggagtgagctgaccaagaaccaggtcagcctgacctgctcgttgcacaag
gcttctatccagcagacatcgccgtggaggtgggagagcaatgggcagccggagaaacactacaagaccacgcctcccgctg
gactccgagcggctctctctctacagcaagcaccgtggacaagagcaggtggcagcaggggaacgtctctctatctgctcctg
gatgcatgaggtcgtgcacaacactacacgcagaagagctctcctctgctcgggtaaatgatctaga

Amino acid sequence:

PELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVHN
AKTQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKG
QPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQENNYKTTTPV
LDSGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSLSLSPGK

38. 2H7 scFv VH L11S (SSS-S)H K290Q CH2 WCH3

Nucleotide sequence:

aagcttgcgcgcatttcaagtgatgacatttcagcttctgtaatacagtgcttcagcataaattgocagagacaaattgttctct
ccagctctccagcaatcctgtctgcatctccagggagagagtcacaatgactgcaggccagcctcaagtgtaagtgtacatgcact

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Amino acid sequence:

20 MDFQVQIFSFLLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKPGSSGFPGKWIYAPSNLASGVPARFSGSGSGTSYSLTISRVEADAATYYCQQWS
FNPTTFGAGTKLELKDGGSGGGGSGGGSSQAYLQQSGAESVRPGASVKMSCK
ASGYTFSTSNYMHVWKQTPRQGLEWIGAIYPNGNDVSTSYNQKFKGKALTVDKSSS
TAYMKLSSLTSEDSAYFYFCARVYVYSNYSYWFYDVTGTTVTYSSDQEPKSSDK
THTSPSSAPPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
25 DGEVHNNAKTQPREEQYNSYRVSVLTLHQDWLNGKEYCKCVSNKALPAIE
KTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTPPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSI
PGK

Amino acid sequence:

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MDFQVQIFSLILISASVILARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QKPKGSSPKPWYIAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGGSGGGSGGGSSQAYLQQSGAESVRPGASVMSKSC
ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFGKATLTVDKSSS
5 TAYMQLSSLTSEDSAVFYFCARVYVYSNSYWFYDVWGTTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDITLMISRTPTEVTCVVVDVSHEDPEVKFNWYV
DGVVEVHNAKTPQPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPRPEQVYVTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
10 NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSQSVMEALHNHYTQKSLSLS
PGK

40. A339PCH2

Nucleotide sequence:

cctgaactcctgggggaccgtcagcttctctctcccccaaaacccaaggacacctcatgatctccggacctcagggtcac
15 atgcgtgtgtgtggacgtgagccacgaagacctgagggtcaagtcaactggtacgtgacggcgtggaggtgcataatgccaa
gacaaagccgcggggagagcagtagacaacacgacgtaccgtgtgtgacgtcctccaccgtctgcaccagcaggtcgtcgaatg
gcaaggagtagcaagtgcacaggtctccaacaagccctccagcccccacagagaaacaatctccaaaccccaaa

Amino acid sequence:

PELLGGPSVFLFPPKPKDITLMISRTPTEVTCVVVDVSHEDPEVKFNWYVDGVVEVHN
20 AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKPK

41. A339P-CH2 WCH3

Nucleotide sequence:

cctgaactcctgggggaccgtcagcttctctctcccccaaaacccaaggacacctcatgatctccggacctcagggtcac
25 atgcgtgtgtgtggacgtgagccacgaagacctgagggtcaagtcaactggtacgtgacggcgtggaggtgcataatgccaa
gacaaagccgcggggagagcagtagacaacacgacgtaccgtgtgtgacgtcctccaccgtctgcaccagcaggtcgtcgaatg
gcaaggagtagcaagtgcacaggtctccaacaagccctccagcccccacagagaaacaatctccaacccaaggagcagccc
30 cgaagaaccacaggtgtacacctgcctccatcccgaggatgagctgaccaaagaacagggtcagcctgacctgctgtcgaagg
cttctatccagcgacatcgcctgtggagtgaggagagcaatggcgagccggagaacaactacaagaccagcctccctgctgtgg
actccgagcctcctctctctacagcaagctcaccgtggacaagagcaggtggcagcaggggaacgtctctcatgctccgtg
atgcatgaggtctgtccaaaccactacacgacgaagagcctcctctgtctcgggtaaatgatctaga

Amino acid sequence:

PELLGGPSVFLFPPKPKDITLMISRTPTEVTCVVVDVSHEDPEVKFNWYVDGVVEVHN
35 AKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKPKG
QPREPQVYVTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPV
LDSDGSFFLYSKLTVDKSRWQQGNVFSQSVMEALHNHYTQKSLSLSPGK

42. 2H7 scFv VHL1S (SSS)-SII A339P CH2 WCH3

Nucleotide sequence:

aagctgcgcgcagtgatttcaagtcagattttcagcttctcctaatacgtgttcacgtacaattgccagaggacaaattgtctct
cccagctctccagcaatcctgtctgtcctccaggggagaaagtcacaatgacttcgaggcgccagctcaagtgtaagttacatgcact
45 ggtaccagcagaagccaggatctccccaacctgcgattatgcctccacaaacctgcttctgtgagtcctcgtctgtcgtcagtg
cagtggtgtgtgggacctcttactctctcacaatcagcagagtgagggtgaagatgctgccatttacttccagcagtgaggattt
taaccacacacagctgtcgtgtcgggacaagactggagctgaagaatgctggcgtggtcctggcggtgtgtgactcgtggaggagtg
ggactctcagctcattatctacagcagcttggggctgagtcggtagggcctgagcaagatgctcgtcgaagcgtctgtcgc
20 tacaattaccagttacaatagcactgggtanaagcagacactagacaggcgctggaatgatttgagctattatccaggaat
ggtgatacttctacaatcagaatgcaaggcgcaagccacactgacttgagacaatcctccagcagcagcctacatgcagctcag
cagcctgcactgaagactcgtcgtctattctgtgcgaagtggtgtactatagtaactcttactgctgatgtctgtgggcac

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agggaccacgctgaccgtctctctgatcaggagcccaaatctctgacaaaactacacatccccaccgtctcagcacctgaact
cctgctggggaccgtcagctctctctctcccccaaaacccaaggacacctcatgatctcccggagccctgagggtacatgcgtgg
tggtggacgtgagccacgaagacctgaggtcaangttcaactggtacgtggagcgcgtggaggtgcataatgccaaagacaaagc
cgcgggagagcagatcaaacagcacgtaccgtggtggtcagcgtctcaccgtcctcaccaggagctgctgaatggcaaggag
5 tacaagtgcaggtgtccaaacaagccctccagcccccattcgaaaaactctccaaaccaaagggcagccccgagaacc
acaggtgtacacctgcccccaccggatgagctgaccaagaaccaggtcagcctgacctgctggtcgaaggctcttatccc
agcagcatcgccgtgaggtggagagcaatggcgagccggagaacaactacaagaccagcctccgctgctgactccgacg
gctcctctctctctacagcaagctaccgtggacaagcaggtggcagcaggggagcgtctctcatgctcctgtagatgag
gctctgcacaaccactacacgcgaagagcctctcctgtctccggtaaatgatctaga

10 Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYCCQWWS
FNPTTFGAGTKLELKDGGSGGGGGSSQAYLQQSGAESVRPGASVKMSCK
15 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKALTIVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYDVGWGTGTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV
DGVEVHNAKTKPREEQYNSTRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKPKGQPREEQYNTLVPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
20 NYKTTTPVPLDSGSFFLYSKLTVDKSRWQQGNVFSCSVMEALHNHYTQKSLSLS
PGK

43. 2H7 scFv VHL11S (CSS-S)H A339P CH2 WCH3
25 Nucleotide sequence:
aagcttgcgccatggatgttcaagtgacagatttcaactctctgaatcagtgcttcacgataaifccagaggacaaatgttctct
cccagctccagcaatctctgtctcgtcgtccagggagaaaggtcacaactgactgcagggccagctcaagtgtaagtacatgcaat
ggtaccagcagaagccaggaatcccccacaacctggaattatgcccacccaactcgtgttggagtcctgtctcgttcaatg
30 gtagtgggtctgggacctcttactctctcaaatcagacagagtgagggtgaagatgctgccactattactgccagcagtggaagt
taaccacccacgttccgtctgggaccaaagctggagctgaagatggcggtgctcggcggtggtggtatctggagagaggtg
ggagctctcagcgttctacagcagctcgggctgagtcggtggagcctgggacctgaggaatgactcctcagggccttggc
tacacatttaccagttacaatgcaactgggtaagcagacacctagacagggcctgggaatggattgagctattatccaggaaat
ggtagacttctcaaatcagaagttcaaggcccaagccacactgactglagacaaatctccagcagcgtactacatcgactcag
cagcctgacatctgaaagcctcgtctctatttctgcaagagtggtgtactatagtaactcttactggtactctcgtctgggac
35 agggaccacggtcaccgtctctctgatcaggagcccaaatctgtgacaaaactcacacatccccaccgtctcagcacctgaact
ctctggggggcagcgtcagttctctctcccccaaaacccaaggacacctcatgatctcccggaccctgaggtacacatcggtg
tggtgagctgagccacgaagacctgaggtcaagttcaactgtacgtggagcgcgtggaggtgcataatgccaaagacaagc
cgcgggagcagcaglacaaagcagctaccgtgtgtgctcagcgtctcaccgtcctgcaccagcactgctgaatggcaaggag
tacaagtgcaagctccaacaagccctcccagcccccacgagaaaacatctccaaacccaaggcagccccgagagaacc
40 agcaggtgacacctgcccctccacccggatgagctgaccaaagaaccaggtcagcctgacctgctgttcaaggtcttatccc
agcagcatcgccgtggatgggagagcaatggcgagccggagaaactacaagaccagcctccgtgctggagctccgacg
gctcctctctctctacgaagctcaccgtggacaagcaggtggcagcagggagcagcgtctcttactgctcgtgatgacgag
gctctgcacaacctacacgcgaagagcctctcctgtctcgggtaaatgatctaga

45 Amino acid sequence:
MDFQVQIFSFLISASVIIARGQIVLSQSPAILSASPGEKVTMTCRASSSVSYMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGSGTSYSLTISRVEAEDAATYCCQWWS
FNPTTFGAGTKLELKDGGSGGGGGSSQAYLQQSGAESVRPGASVKMSCK
50 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGDTSYNQKFKGKALTIVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYNSNSYWFYDVGWGTGTVTVSSDQEPKSCDK
THTSPSSAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYV

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DGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKPKGQPREEPVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPEN
NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCFSVMHEALHNHYTQKSLSLS
PGK

5

44. G28-1VH

Nucleotide sequence:

gcggctccagctcgacgagctcgacctgagctggaaaagcctggcgcttcagtggaattctcgcaaggctctgttactcatic
10 actgctcacaatatgaactgggtgaagcagaataatgaaagagccttgagtggaattggaatattgatccttattatgggtgacta
ctcaacaacgggaagtctcaaggccacattgactgtagacaaatctccagcacagcctacatgcagctcaagagctctgac
atctgaggactctcgagctctattactgtgcaagatcgctggccctatggactactggggtcaaggaaacctcagtcaccgtctctct
gatcag

15 Amino acid sequence:

AVQLQQSGPELEKPGASVKISCKASGYSTGYNMNWVKQNNGKSLSEWIGNIDPY
YGGTTYNRKFKGKATLTVDKSSSTAYMQLKSLTSEDSSAVVYCARSVGPMDYWG
QGTSVTVSSDQ

20 45. G28-1VL

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggttcacagtggtgcagatgfgacatccagatgact
25 agtctcagctccctatctgcatctgtgggagagactgtcacatcacatgtcgaacaagtgaatggttacagttattggcttggt
atcagcagaacaacgggaaatctcctcagctcctgtctcttttgcaaaaccttagcagaaggtgtgcatcaagggttcagtgga
gtgagatcagcagacagttttctctgaagatcagcagcctgcagcctgaagattctggaagttattctgtcaacalcattcagataat
cctgtgagcttccggtggagccaccgaactggagatcaaaaggtggcggctggcggcgggtgtggtgctgggtgctggcggat
cgtca

Amino acid sequence:

30 MVSTAQFLGLLLLWLTGGRCDIOMTQSPASLSASVGETVTITCRITSENVVSYLAW
YQQKQKGKSPQLLVFAKTLAEGVPSRFSGSGGTQFSLKISSLQPEDSGSYFCQHH
SNPWTFGGGTELEIKGGGSGGGSGGGSS

35 46. G28-1 scFv

Nucleotide sequence:

aagcttgccgccatggtatccacagctcagttccttgggttgctgctgctgtggttcacagtggtgcagatgfgacatccagatgact
agtctcagctccctatctgcatctgtgggagagactgtcacatcacatgtcgaacaagtgaatggttacagttattggcttggt
40 atcagcagaacaacgggaaatctcctcagctcctgtctcttttgcaaaaccttagcagaaggtgtgcatcaaggttcagtgga
gtgagatcagcagacaggtttctctgaagatcagcagcctgcagcctgaagattctggaagttattctgtcaacalcattcagataat
ccgtggagcttccggtggagccaccgaactggagatcaaaaggtggcggctggcggcgggtgtggtgctggcggcggat
cgtcagcgggtcagctgcagcagctcgcagctggaaagcctggcgttcagtggaagattctcgaaggtctctggttact
cattcactgctacnaatgaaactgggtgaagcagaataatggaagagccctgagtggnatggaatattgatccttattatgtggt
actacctacaacgggaagtcaagggtcgaagccacattgactgtagacaaatctccagcacagcctacatgcagctcaagagct
45 gacatctgaggactctgcagcttattactgtgcaagatcgctggccctatggactactgggtcagaagaaacctcagtcaccgtctc
ttctgatcag

Amino acid sequence:

50 MVSTAQFLGLLLLWLTGGRCDIOMTQSPASLSASVGETVTITCRITSENVVSYLAW
YQQKQKGKSPQLLVFAKTLAEGVPSRFSGSGGTQFSLKISSLQPEDSGSYFCQHH
SNPWTFGGGTELEIKGGGSGGGSGGGSSAVQLQQSGPELEKPGASVKISCKA

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SGYSFTGYNMNWKQNNKGSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMIDYWGQTSVTVSSDQ

5 47. G28-1 VHL11S

Nucleotide sequence:

gcggtccagctgcagcagctcgtgacgtgagtcggaaaagcctggcgcttcagtgaagatttctgcaaggctcttggttactcattc
actggctacaatatgaactgggtgaagcagaataatggaagagccttgagtggaattgatacttattatgttggtacta
cctacaaccgggaagtccaaggcgaagccacattgactgtagacaataatctccagcacagcctacatgcagctcaagagctgcac
10 atctgagactctgcagctctattactgtgcaagatcggtcgccctatgactactggggtcaaggacctcagtcaccgtctctct
gatcag

Amino acid sequence:

15 AVQLQSGPSEKPGASVKISCKASGYSFTGYNMNWKQNNKGSLEWIGNIDPYY
GGTTYNRKFKGKATLTVDKSSSTAYMQLKSLTSEDSAVYYCARSVGPMIDYWGQ
GTSVTVSSDQ

20 48. G28-1 VHL11S scFv

Nucleotide sequence:

aagcttccgccatggtatccacagctcagttccttgggttctgctgctgtggcttacaggtgcagatgtgacatccagatgactc
agctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtgaataattttacagttatttgcttggt
atcagcagaacagggaanaattcctcagctcctgtctcttttgcataaaccttagcagaaaggtgtgccatcaagggtcagtgga
25 gtggtatcaggcacacagtttctctgagatcagcagcctgcagcctgaagattctggaagtatttctgcaacalcattccgataat
ccgtggagcttcgtggaggcaccgaactggagatcaaaagtgccggtggctggcggtgtggtgggtcgggtggcggtggat
cgtcagcgttcagctgcagcagctgtgacgtgagtcggaaaagcctggcgcttcagtggaagatttctgcaaggctcttggttact
catctactggctacaatatgaaactgggtgaagcagaataatggaagagccttgagtggaattggaatatgtatccttattatgtggt
actacctaacccggaagtccaaggcgaagccacattgactgtagacaataatcctccagcacagcctacatgcagctcaagagct
30 gacatctgaggactctgcagctctattactgtgcaagatcggtcggccctatggactactgggttcgaaggacctcagtcaccgtctc
ttctgatcag

Amino acid sequence:

35 MVSTAQFLGLLLLWLTGGRCDIQTQSPASLSASVGETVTTTCRTSENVSYLAW
YQQQKQKSPQLLVSFATKLAEGVPSRFSGSGGTQFSLKISLQPEDSGSYFCQHS
DNPWTFGGGTLEIKGGGGSGGGSSAVQLQSGPSEKPGASVKISCKA
SGYSFTGYNMNWKQNNKGSLEWIGNIDPYYGGTTYNRKFKGKATLTVDKSSST
AYMQLKSLTSEDSAVYYCARSVGPMIDYWGQTSVTVSSDQ

40 49. G28-1 scFv (SSS-S)H WCH2 WCH3

Nucleotide sequence:

aagcttccgccatggtatccacagctcagttccttgggttctgctgctgtggcttacaggtgcagatgtgacatccagatgactc
agctccagcctccctatctgcatctgtgggagagactgtcaccatcacatgtcgaacaagtganaattgttacagttatttgcttggt
atcagcagaacagggaanaattcctcagctcctgtctcttttgcataaaccttagcagaaaggtgtgccatcaagggtcagtgga
45 gtggtatcaggcacacagtttctctgagatcagcagcctgcagcctgaagattctggaagtatttctgcaacalcattccgataat
ccgtggagcttcgtggaggcaccgaactggagatcaaaagtgccgggtggctggcggtgtggtgggtcgggtggcggtggat
cgtcagcgttcagctgcagcagctgtgacgtgagtcggaaaagcctggcgcttcagtggaagatttctgcaaggctcttggttact
catctactggctacaatatgaaactgggtgaagcagaataatggaagagccttgagtggaattggaatatgtatccttattatgtggt
actacctaacccggaagtccaaggcgaagccacattgactgtagacaataatcctccagcacagcctacatgcagctcaagagct
50 gacatctgaggactctgcagctctattactgtgcaagatcggtcggccctatggactactgggttcgaaggacctcagtcaccgtctc
ttctgatcagatcaggagcccaactcttgcataaaactcacatccaccgtctctcagcacctgaaactcgtgggtggagcctgc

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atccccggatgagctgaccaagaaccaggtcagcctgacctgcctggctcaaaagcctctatccagcgcacatgccgtggagtgga
gagagcaatggggagccggaggaaccaactacaagaccagcctcccgctgctggactccagcggctcctctctcagacaag
ctcaccgtggacaagagcaggtggcagcaggggaacgctctctcatgctccgtgatgatgaggtctgcacaaccactacacg
agaagagcctctccctgctctcgggtaaatgatctaga

5

Amino acid sequence:

MVSTAQFLGLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVVSYLAW
YQQKQKGSPLLVSFAKTLAEGVPSRFSGSGGTQFSLKISSLPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGSGGGGSGGGSSAVQLQSGPSEKPGASVKISCKA
SGYSTGYNNMNVVKQNNGKSLIEWIGNIDPHYGGTTYNRKFKGKATLTVDKSSST
10 AYMLKSLTSEDSAVYYCARSVGPMIDYWGQGTSTVTVSSDQEPKSCDKTHTSPSS
APELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYVDGVEVH
NAKTKPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIETISKAK
GQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
15 VLDSGSGFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKLSLSLSPGK

53. G28-1 scFv VH L11S (CSC-S)H WCH2 WCH3

Nucleotide sequence:

aaagtgcgccatggtatccacagctcagttccttgggtgctgctgctgtggcttacaggtggcagatgtgacatccagatgactc
20 agtctccagctccctatctgcactgtgaggagactgtcacatcacatgtcgacaagaatgaaatgttaccagtatttggctggt
atcagcagaaacagggaataatctctcagctcctgctctcttttgcaaaaccttagcagaagggtgctccatcaaggcttcagtgga
ctggatcaggcacacagattttctcgaagatcagcagcctgcagcctgaagattctggaattattctgtcaacatcattccgataat
cgtggagacttctggggagcgaccgcaactggagatcaaaagggtggcggctcggcggtgggtgggtgggtgggtgggtgggtgggt
25 cgtcagcggctcagcagcagctctggaactgagctcggaaaaagcgtggcgttcagtggaagatttctgcgaaggctctgtgtact
cttaccatggctcaatagatcgggtggaagcagaataatggaagaccccttgatggattggaatattgacttattatgtggt
actacctacaacgggaagttcaaggcccaagccacafgactgtgacaaatctccagcagacgctcatgagctcaagagct
gacatctgagcagctcgtcagctclattactgtgaagatcggtcggccctatgactactgggtcgaagaaactcagtcacgctc
ttctgatcaggagcccaatctgtgacaaaactcacactctcaccgtgctcagcagcctgaactcctgggtgacgtcagctctc
30 ctctcccccaaaacccaagcacacctctatgatctccggacccctgaggtcacatgctggtggtggagctgagccacgaag
acctgaggtcaagttcaactggtacgtggcggcgtggaggtgcataatgccaaagcaaaagccgcgggagggagcagtaaac
agcagctaccgtgtgctcagcgtctcaccgtctgcaccaggactggtgaaatggcaaggagtacaagtgcaaggtctccaaca
aagccctccagcccccatcgagaaaacaatctcctcaagggcgaagcccgagagaccacaggtgtacacacctgccccca
tccgggatgagctgaccagaacacaggtcagcgtcactgctgctcgaaggtcttctatccaagcgacatcgccgtggagtg
35 gagagcaatggcgagcgggagacaactacaagaccagcctccgtgctggactcgcagcgtctcttctctctcactcagaag
ctcaccgtggaacagagcaggtggcagcaggggaacgtcttctatgctcgtgatgcatgaggtctctcacaaccactacacg
agaagagcctctcctgctcgggtaaatgatctaga

35

Amino acid sequence:

MVSTAQFLGLLLWLTGGRCDIQMTQSPASLSASVGETVTITCRTSENVVSYLAW
40 YQQKQKGSPLLVSFAKTLAEGVPSRFSGSGGTQFSLKISSLPEDSGSYFCQHHS
DNPWTFGGGTELEIKGGGSGGGGSGGGSSAVQLQSGPSEKPGASVKISCKA
SGYSTGYNNMNVVKQNNGKSLIEWIGNIDPHYGGTTYNRKFKGKATLTVDKSSST
AYMLKSLTSEDSAVYYCARSVGPMIDYWGQGTSTVTVSSDQEPKSCDKTHTSPPC
SAPELLGGPSVFLFPPKPKDTLMISRTPEVTCVVDVSHEDPEVKFNWYVDGVEVH
45 HNAKTKPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIETISKAK
KGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTPP
PVLDSGSGFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQKLSLSLSPGK

50

54. G28-1 scFv VH L11S (SSC-P)H WCH2 WCH3

Nucleotide sequence:

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aagcttgcgcccatggatccacagctcagttccttgggtgctgctgctggtgttacaggtggcagatgfgatccagatgact
atgtccagcctccatctgcactgtgggagagactgtccacatcatgtcgaacaagtgaatattgttcatgtatttggctggt
atgcacagaaacaggaaatctctcagctcctgtctctttgcaaaaacctgacgaagggtgtggtacacaggttcagtgga
gtgacagcgcacacaggtttctctgaaatcagcagcctgcagcctgaagatctggaagtatttctgcaacatcatccgataat
5 cctggacgttgcgtgggagccaccgaactggagatcaaaaggtggcgggtgctcggcggtgggtgggtggcggtggcggtg
cgtcagcgttcacgtgcagcagctggacgtgagtcggaaaagcctggcgctcagtgaaagtattcgaagctctctggtact
catcactggctacaatatgtaactgggtgaagcagaataatggaaagagccttgagtggaattgaaattatgatccttattatggtgt
actacctacaaccggaaagtccaaggccaagccacattgactgtgacaaatcctccagcagacgctatgtagctcgaagctct
gacatctgaggactctgcagcttattactgtgcaagatggctggccctatggactactgggclaaaggaaocctcagtcaccgtct
10 tctgtatcaggagcccaatctctgacaaaactcacatccaccgtgcccagcactgaactcctgggggagccgtcagctct
cctctcccccaaaaacccaaggacacctcatgatctcccggaccctgaggtcacaatgcgtgggtgggtggacgtgagccacgaa
gacctgaggtcgaagtcaactggtagcgtgagcggcgtggaggtgcataatgccaaagacaagcggcggtggagcagctacaa
cagcagctaacgtgtgtgtagcgtctcaccgtcctgaccagagctggtgagtgaatggcgaaggagtgacaagtgaagctgtccaac
aaagccctccagcccccactcagaaaacaaatctccaaagccaagggcagcccccagaaacacacaggtgtacacacctgccccc
15 atcccggatgagctgaccaagaacaggctgacgtgacctgacctgctcaaaagccttctatccagcgcacatgccgtggaggtgg
gagagcaatggggcagccgggaacaactacaagaccagccctccgtgctggactccgagcgctccttctctctacagaag
ctcaccgtgacaaagcagctggcagcaggggaacgtctctctatgctcctgtagatgaggtcctgcacaaccactacacgc
agaagagcctcctctctcgggtaaatgatctaga

20 Amino acid sequence:
MVSTAQFLGLLLWLTTGGRCDIQMTQSPASLSASVGETVTITCRTSENVYSYLAW
YQKQKGSQPLLVSFAKTLAEGVPSRFSGSGSTQFSLKISSLPEDSGSYFQOHSS
DNFWTFGGGTELEIKGGGGSGGGSGGGSSAVQLQSQSGPESEKPGASVKISCKA
SGYSFTGYNNMNVVKQNNGKSLIEWIGNIDPHYGGTYYNKKFKGKATLTVDKSSST
25 AYMQLKSLTSEDSAVYYCARVGPMDYWGQTSVTVSSDQEPKSSDKTHTSPPCP
APELLGGPSVFLFPPKPKDTLMISRTPEVTCVVVDVSHEDPEVKFNWYVDGVEVH
NAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAK
QKPREPQVYVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYIKTPP
VLDSDGSFFLYSKLTVDKSRWQQGNVFSQSCVMHEALHNHYTQKSLSLSPGK

30 II. 54. ICTLA4 IIIGI (SSS-S)II P238SII2 WCH3

Nucleotide sequence:

atgcttgccttggaattcagcggcacaaggctcagctgaacctggctgccaggacctggccctgcacttctgtttttctctcttc
atccctgtcttctgcaaaagcaatgcacgtggccagcctgctgtgactgcccagcagcgggcatcgccagctttgtgtgga
35 gtatgcatctccagcgaagccactgaggtccgggtgacaggtgtcggcaggtgacagccaggtgactgaagtctgtgcgc
aacctacatgacggggaatgagttgaccttctagatgattcatctgcagcggcactccagtggaatcaagtgaaactacat
ccaaggactgagggccatggcagcgggactctacatctgcaaggtggagctcatgccaccgccatactactcgggcatagc
caacggcaaccagatttgaattgatccagaaccgtgccagattctgatcaaccaaatctctgacaaaactcacacatcccca
ccgtctctcagcactgaactcctgggggagctgacgttctctctctcccccaaaaacccaaggacacccctatgatctccggac
40 cctcaggtgcacatgcgtgtgtgtggacgtgagccacgaagaccctgaggtcaagttcaactggtagcggcggtggaggt
cgtatgaatggcaagacagcggcgaggagcagctacacagcagcagctgtgtgctgacgtgctcctaccgtctcaccagc
actggctgaatggcaagaggtacaaagtgcgaaggtctccaaaagccctccagcccccacgagaaacaatctccaaagcca
aaggcgagcccccagacaacaggtgtacacccctcccccatccgggatgagctgaccaagaagcaggtcagctgacctgc
ctgtgcaaggcttctatcccccagcgcacatcgccgtgaggtggagagcgaagcggcagccgggaacacaactacaagacacg
45 tcccgtgctgactccgacggctccttctctctacagcagctaccgtggcaagagcaggtggcagcaggggaacgtcttct
catgctcctgtagatgaggtcctgcacaaccactacacgcagaagagcctcctctgctccgggtaaatga

Amino acid sequence:

MACLGFRHQHKAQLNLAARTWPCTLLFFLLFIPVCKAMHVAQPAVVLASSRGIAS
50 FVCEYASPGKATAEVRVTVLRQADSQVTEVCAATYMTGNELTFLLDSDICTGTSSGN

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QVNLTIQGLRAMELDTGLYICKVELMYPPPYLGLIGNGTQIYVIDPEPCPDSDQPKSSD
KTHTSPPSSAPELDDGSSSVFLFPKPKDLMISRTPEVTCVVVDVSHEDPEVKFNWY
VDGVEVHNAKTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPI
EKTISKAKGQPREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPE
5 NNYKTTTPPVLDSDGSFELYSKLTVDKSRWQQGNVFCSCVMHEALHNNHYTQKSLSL
SPGK

55. Fe2-2 VL

Nucleotide sequence:

10 gttgtaagcttgccgccatggattcacagccccagggttcttatgttactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagcttcacatcctccctagctgtgctcagttggagagaagggttctatgagctgcaagtcacagtcagagccctttatataatcacaaat
caaaagaactacttgccctgtgaccacagatataccaggcgagctctcctaactgctgatttactgggcacctacatagggaatctgg
gtccctgafcgcttcacagcgagtgatctgggacagatttacctctaccatcagcagagtgtaagctgaagacctggcagttta
15 ttactgtcagcaatattatatactatctcccccaggttcggaggtggcaccaggctggaataaagggtggcgggtgctcggcggtg
gtgggtcgggtggcggcgggagctcg

Amino acid sequence:

MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLLYNHN
QKNYLA WYQIQPGSPKLLIYWASTRESGVDPDRFTGSGSGDTFTLTISR VKAEDLA
20 VYYCQQY YTYPTFGGGTKLEIKGGGGSGGGGGSGGGSS

56. FC2-2VH

Nucleotide sequence:

25 Gggagctcgcagctgctcagttgaaggagtcaggacctggcctggctggcgccctcacagagcctgtccatcacatgcacccgtctca
gggttctcatfaaccgtctatgggttaactgggtgccagctccaggaaaggctggactggctgggaatgatalggggtgat
ggagcagcagactataatcagctctcaaatccagactgagcatcagtaaggacaactccaggagccaagtttcttaaaaaaggac
agtctacaactgatgacacagccaggtactactgtgccagagatcactatgttaccacatgtatgactgactggtggctcaaggaa
acctcagtcaccgtctcctctgatcag

30 Amino acid sequence:
GSSQVQLKESGCPGLVAPSQSLSTCTVSGFSLTVYGVNVWRQPPGKGLDWLGMIV
GDGSTDYNSALKSRLSISKDNSQVFLKMDSLQTDTRYARYCARDHYGTHYAM
DYWGQGTSTVTVSSDQ

57. FC2-2scFv

Nucleotide sequence:

35 gttgtaagcttgccgccatggattcacagccccagggttcttatgttactgctgctatgggtatctggtacctgtggggacattgtgatg
tcacagcttcacatcctccctagctgtgctcagttggagagaagggttctatgagctgcaagtcacagtcagagccctttatataatcacaaat
caaaagaactacttgccctgtgaccacagatataccaggcgagctctcctaactgctgatttactgggcacctacatagggaatctgg
40 ggtccctgctcgtcttcacagcgagtggtatctgggacagatttacctctaccatcagcagagtgtaaggctgaagacctggcagttta
ttactgtcagcaatattatatactatctcccccaggttcggaggtggcaccaggctggaataaagggtggcgggtgctcggcggtg
gtgggtcgggtggcggcgggagctctcaggtgcagttgaaggagtcaggacctggcctggctggcgccctcacagagcctgtcc
atcacatgaccgtctcaggggtctcattaaacctgtatggtttaactgggtgcagacctccaggaagggtctggactggtctgg
gaatgatattgggtgatggagcagacagactataatcagctctcaaatccagactgagcatcagtaaggacaactccagagccaa
45 gtttcttaaaaatggacagctcacaactgatgacacagcaggtactactgtgccagagatcactatgttaccactatgtatgg
actactggggtcaaggacaacctcagtcaccgtctcctctgatcag

Amino acid sequence:

50 MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLLYNHN
QKNYLA WYQIQPGSPKLLIYWASTRESGVDPDRFTGSGSGDTFTLTISR VKAEDLA
VYYCQQY YTYPTFGGGTKLEIKGGGGSGGGGGSSQVQLKESGCPGLVAPSQ

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SLSTITCTVSGFSLTVYGVNVWRQPPGKGLDWLGMWGDGSTDYNSALKSRLSISK
DNSKSQVFLKMDSLQTTDDTARYYCARDHYGTHYAMDYWGQGSTVTVSSDQ

58. FC2-2 VHL11S

5 Nucleotide sequence:

gggagctctcagctgacgttgaaggagtcagaccctggctcggcggccctcacagagcctgtccatcacatgcaccgtctcag
ggctctcattaacctctatggtgttaactgggttcgccagcctccaggaagggtctggactggctgggaatgatatgggtgatg
gaagcacagactataatctcgtctcaaatccagactgagcatcagtaaggacaaactccaagagccaagtgtttcttaanaatggaca
gtctacaactgatgacacagccaggtactactgtgccagatgactactggtaaccactatgctatgactactggggccaaggaa
10 cctcagtcaccgtctctctgatcag

Amino acid sequence:

(GSS)QVQLKESGPGSVAPSQSLSTITCTVSGFSLTVYGVNVWRQPPGKGLDWLGM
WGDGSTDYNSALKSRLSISKDNSKSQVFLKMDSLQTTDDTARYYCARDHYGTHY
15 MDYWGQGSTVTVSSDQ

59. FC2-2 VH L11S scFv

Nucleotide sequence:

gttgtaagcttgcgccatgattcacaggccaggttctatgttactgctgctatgggtatctggctacctgtggggacattgtgatg
20 tcacagcttccatcctccctagctgtgctagttggagagaaggtttctatgagctgcaagtcacagtcagacctttataatcacaaat
caaaagaaactacttggcctggtaaccagcagataccaggcagctctcctaaactgctgatttactgggcatccactagggaatctgg
gttccctgatcgtcttcacaggcagtgatctgggacagattcacctcaccatcagcagagtgaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctccacgttcggagggtggcaccagaactggaaataaaaggctggcggctgctcggcggtg
25 gtgggtcgggtggcgccggggagctctcaggtgacgttgaaaggagtcaggacctggctcgggtggccctcacagagcgtctcc
ateacatgcaccgtctcagggtctcattaaacctctatggtgtaactgggttcgccagcctccaggaaaggctggactggctgag
gaatgatatgggtgatggaagcacagactataatcagctctcaaatccagactgagcatcagtaaggacaactcaagagccaa
gttttcttaaaaatggacagctcacaactgatgacacagcaggactactatgctccagagatgactactggtaaccactatgctatgg
actactgggtgtaaggaaacctcagtcacctgtctctctgatcag

30 Amino acid sequence:

MDSQAQVLMILLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLYNIN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVDPDRFTSGSGSDTFTLTISR VKAEDLA
VYYCQQYYTTPPTFGGGTKLEIKGGGGSGGGSGGGSSQVQLKESGPGSVAPSQ
SLSTITCTVSGFSLTVYGVNVWRQPPGKGLDWLGMWGDGSTDYNSALKSRLSISK
35 DNSKSQVFLKMDSLQTTDDTARYYCARDHYGTHYAMDYWGQGSTVTVSSDQ

60. FC2-2 (SSS-S)H WCH2 WCH3

Nucleotide sequence:

gttgtaagcttgcgccatgattcacaggccaggttctatgttactgctgctatgggtatctggtactgtggggacattgtgatg
40 tcacagcttccatcctccctagctgtgctagttggagagaaggtttctatgagctgcaagtcacagtcagacctttataatcacaaat
caaaagaaactacttggcctggtaaccagcagataccaggcagctctcctaaactgctgatttactgggcatccactagggaatctgg
gttccctgatcgtcttcacaggcagtgatctgggacagattcacctcaccatcagcagagtgaaggctgaagacctggcagttta
ttactgtcagcaatattatacctatcctccacgttcggagggtggcaccagaactggaaataaaaggctggcggctgctcggcggtg
45 gtgggtcgggtggcgccggggagctctcaggtgacgttgaaaggagtcaggacctggcctgggtggccctcacagagcgtctcc
atcacatgcaccgtctcagggttctcattaaacctctatggtgttaactgggttcgccagcctccaggaaaggctgtggactggctgag
gaatgatatgggtgatggaagcacagactataatcagctctcaaaatccagactgagcatcagtaaggacaactccagagccaa
gttttcttaaaaatggacagctcacaactgatgacacagcaggactactatgctccagagatgactactggtaaccactatgctatgg
actactgggtgcaaggaaacctcagtcacctgtctctctgatcaggagagcccaaatctctgcagaaactcacacatccaccctgctc
cagcacctgaactctctgggtgacacctcagcttctctctcccccnaaaccagaaggacaacctcatgatctcccggaacctgag
50 gtacatgctgtgggtgtgacctggaaccacgaagaccctgaggtcaagttcaactgtacgtggacaggcggtggaggtgataaat
gccaaagacaagccggcggaaggacngtacaacagcagctaccgtgtgtcagcgtctcaccgtctctgcacaggactggtc

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gaatgccaaggagtagtaacgtgcaagggtctccaaacagccctccagcccccatcgagaaacacatctccaaagccaaggc
agccccgaagaaccacaggggtgacacctgccccatccgggatgagctgaccaagaacaggtcagcctgacctgctgctca
aaggctctatccaaagacatcgccgtggagtgaggagagaggggacgcgggaagaactacaagaccacgctctccgtg
ctggactccgacggctctctctctctacagcaagctcaccgtgacaaagacagcgtggcagcagggaagctctctcatgctc
5 cgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctgctcgggtaaatgatctaga

Amino acid sequence:

MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFLTITSRVKAEDLA
10 VYYCQQYYTYPTFGGGTKLEIKGGGSGGGGSGGGSSQVQLKESGPGLVAPSQ
SLSIITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMWGDGSTDYNALKSRLSISK
DNSKSQVFLKMDSLQITDDTARYYCARDHYGTHYAMDYWGQGSTVTVSSDQEPK
SSDKTHTSPSSAPELLGGPSVFLFPPKPKDITLMISRTPEVTCVVDVSHEDPEVKF
NWYVDGVEVHNATKPREEQYNSTYRVSVLTVLHQDWLNGKEYKCKVSNKA
15 LPAIEKTIKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESN
GQFENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQ
KSLSLSPGK

61. FC2-2 VHL11S (SSS-S)H WCH2 WCH3

20 Nucleotide sequence:

gttgtaagcttgccgcacatgattcacagcccagggtcttatgtactgctgctatgggtatctggtaacctgtggggacatgtgatg
tcacagcttcacatccctcctagctgctgacttggaagaagggttctatgagctgcaagctccagtcagagccctttatataatacaaat
caaaaagaactacttgccctggtaccagcagataccaggcagcttctaaactgctgatttactgggcatccactaggggaatctgg
ggtccctgaltcgtctacagcagcgtggtgatctggagcagatttactctcaccatcagcagagtgaaaggctgaagactgagcagttta
25 ttactgtcagcaattattatactatctccacgttcgaggtggcaccagctggaataaaagggtggcgtgtgctcggcggtg
gtgggtcgggtggcgccgggagctctcaggtgcagtgaaagggtcaggtacacgtgctcgtggcgccctcacagagcctgtcc
atcacatgacacgtctcaggggttctcattaacctgctatgtgttaactgggttcgccagcctccaggaaagggtctgacgtgctg
gaatgatatgggtgatggaagcacagactataaactcagctctcaaatccagactgacatcagtaaggacaaactcacaagaccaa
gttttcttaaaaatggagactctcaaaactgatgacacagccagggtactactgtgccagatcactatgtgaacacactatgctatgg
30 actactggggtcagaagaacctcagtcacccgtctcctctgaltcaggcccaaatctctgacaaaactcacacatccccaccgtct
cagcacctgaaactcctgggtggacgtcagcttctctctcccccacaaagcacacccatcatgctctccggaccctgag
gtcacatcgctggtggtggcagctgagccacgaagacctcagggtcaggttcaactgtgacgtggcggtggagggtgcataat
gccaaagacaagccgcgggagagcagctacaacagcacgtaccgtgtgctcagcgtctcaccgtctgcaccaggactggtgct
gaatggcaaggagtagacaaggtgcaagggtctccaaacaaagccctccagcccccacagaaacacatctcacaagccaaaggcg
35 agccccgagaacacaggggtacacacctgcccccacccgggaatgagctgaccaagaacacaggtcagcctgacctgctgctga
aaggctcttatccaaagacatcgccgtgagtgaggagacaaaggcgacggcgaagaactacaaagaccagcgtccctggtg
ctgacatccagagcgtctctctctctctacagcaagctcaccgtggaacagaagcaggtggcaggggaacgtctctcatgctc
cgtgatgatgaggtctgcacaaccactacacgcagaagagcctctcctctgctcgggtaaatgatctaga

40 Amino acid sequence:

MDSQAQVLMLLLLVWSGTCGDIVMSQSPSSLA VSVGEKVSMSCKSSQSLLYNHN
QKNYLAWYQQIPGQSPKLLIYWASTRESGVPDRFTGSGSGTDFLTITSRVKAEDLA
VYYCQQYYTYPTFGGGTKLEIKGGGSGGGGSGGGSSQVQLKESGPGSVAPSQ
45 SLSIITCTVSGFSLTVYGVNWVRQPPGKGLDWLGMWGDGSTDYNALKSRLSISK
DNSKSQVFLKMDSLQITDDTARYYCARDHYGTHYAMDYWGQGSTVTVSSDQEPK
SSDKTHTSPSSAPELLGGPSVFLFPPKPKDITLMISRTPEVTCVVDVSHEDPEVKF
NWYVDGVEVHNATKPREEQYNSTYRVSVLTVLHQDWLNGKEYKCKVSNKA
LPAIEKTIKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESN
GQFENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFSCSVMHEALHNHYTQ
50 KSLSLSPGK

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PCT/US2003/041600

62. UCHL-1 VH

Nucleotide sequence:

atggcagcgttactctcttactctgctactgattgttctgcatatgtctctccagattactctgaaagagcttgccctgggacttt
gcagccctccagaccctcagctgactgtgtcttctctgggtttcactgaccactatggtataggagtaggttggttcctcagcct
ccaagggaagggtctggagtgctgacacacatttggggaaatgataataagfactataaacacagccctcaggagccgggtcacaac
tctccaaaggattctcccaacaaccaagfactctcctaagatgccaatgtggacactgcagataccgccacatactactgtctctacg
gtcactacttactggggccaaggactctggtcactgtctctga

Amino acid sequence:

MGRLTSSFLLLVPAAYVLSQITLKESGPGILQPSQTLSTLCSFSGFSLTITYGIGVGWIR
QPPGKLEWLTHIWVNDNKYYNTALRSRLTISKSSNNQVLLKIANVDTADTAT
YYCLYGYTYWGQGLTVLSA

63. UCHL-1 VL

Nucleotide sequence:

atgaagtgcctgttaggctgttggtgctgatgttctggattctgcttccatcagtgatgttgatgacccaaactccactctccctgc
cttcaagctcttgagagacagcgtccctcatctcttgcagatctagtcagagccctcttatacagtaatggaaacacctatttacaattggatcct
gcagaagccagcgccagctcctcaaaactctgatctacaacatttccaaacgatitctgggggtccagacaggttcagtgccagtgagg
atcaggagacagatttcacactcaagatcagcagagtgaggctcagggatctggaggtttatctctctcaagtacacatgttccg
tggcagttcgggtggagcacaagctggaaatcaaa

Amino acid sequence:

MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVS LGDQASISCRSSQSLLYSNGNTYL
HWY LQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGKLEIK

64. UCHL-1 scFv

Nucleotide sequence:

gtgttaaagcttccgccatgaagttgcctgttaggctgttggtgctgatgttctggattctgcttccatcagtgatgttgatgaccc
aaactccactctccctgctgtcagcttggagatcagccctccactcttgcagatctagtcagagcccttttacaagtaatggaaac
ctctatttacaattgggtaccctcagaagccagcgcagctcacaacactctgatacacaacttccaaacgatitctgggtcccca
caggttcagtgccagtgatgcagggacagatttcacactcaagatcagcagagtgaggctcaggatctggaggtttatctctgctc
tcaangtacacatgttccgtggagcttccgggtggagccaccaagctggaaatcaagatggcgtggctcggcggtgtgtgatct
ggaggagtggtggagctctcagattactctgaagaagtctggccctgggatctgcagccctccagaccctcagctcgaattgttctt
tctctgggttttctcagaccactatggtataggagtaggttggttcagctcagccctcagggaagggtctgagtggtgcacacat
ttgtggatgataataaagactactataacacagccctgaggagccggctcacaactccaaaggattctctcacaacaaagactactc
caagatcgcaatgtggacactgcagataccgccacatactactgtctctacggctacacttacttgggcccaaggactctgggtca
ctgtctctcgtcatca

Amino acid sequence:

MKLPVRLLVLMFWIPASISDVVMTQTPLSLPVS LGDQASISCRSSQSLLYSNGNTYL
HWY LQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSDFTLKISRVEAEDLGVYFCS
QSTHVPWTFGGGKLEIKDGGSGGGGSGGGSSQITLKESGPGILQPSQTLSTLCS
FSGFSLTITYGIGVGWIRQPPGKLEWLTHIWVNDNKYYNTALRSRLTISKSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGLTVTSAD

65. UCHL-1 VH IIISL12S

Nucleotide sequence:

gggagctctcagattactctgnaagagctctgcccctgggactctgcagccctccagaccctcagctcgaactgttcttctctcgggtt
tcaactgaccactatggtataggagtaggttggttcagcctccagggaagggtctggagtggctgcacacacatttgggtggaat

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gataataagtactataacacagccctgaggagccggctcacaatcccaaggattcctccaacaacaggtactcctcaagatgc
caatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggcccaaggagactctggctactgtctgtct
gataca

- 5 Amino acid sequence:
(GSS)QITLKESGPGSSQPSQTLSTLCSFSGFSLLTTYGIGVGWIRQPPGKGLEWLTHIW
WNDNKYNTALRSLRTISKDSSNNQVLKIANVDTADTATYYCLYGYTYWGQGT
LVTVSAD

10 **66. UCHL-1 scFv VH L11S**
Nucleotide sequence:

gtgttaagctgcccgcataagttgctgttagctgtgtgctgatgtctggattcctgctccatcagtgatgttgatgacc
aaactccactctccctgctgtcagcttggagatcaggccctcactctctgagatctagtcagagccctttacagtaatggaac
15 acctatttaccattggtacctgcagaagccaggccagctctccaaaactcctgatctacaactttccaacgattttctgggtccca
cagggttcagtgccagtggatcaggagcagattcactcaaatcagcagagtgaggagctgaggatctggaggtttattctgct
tcaaatgtacacatgttccgtggacgttcgtggagccaccaagctggaaatcaaatggcgggtgctcggcggtgggtgagct
ggagaggtgggagctctcagattactctgaagagctgtgcccctgggagctccagccctccagaccctcagctgtgactgttc
20 ttctctgggttttactgaccattatggtataggagtaggtggattcgtcagccctccagggagggctggaggtggctgacacac
atttgggtgaatgataataagactataacacagccctgaggagccgctcacaatctccaaggatctccacaacacaaagactc
ctcaagatcggcaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaaaggactctggt
actgtctctgctgataca

- Amino acid sequence:
25 MKLPVRLVLVLMFWAPISISDVVMTQTPLSLPVSLGDQASISCRSSQSLLYSNGNTYL
HWYLLQKPGQSPKLLIYKLSNRFSGVSPDRFSGSGSGTDFTLKISRVEAEDLGVIYFCS
QSTHVPWTFGGGTGLEIKDGGGSGGGGSGGGSSQITLKESGPGSSQPSQTLSTLTC
SFGFSLTTYGIGVGWIRQPPGKGLEWLTHIWWDNKYNTALRSLRTISKDSSNN
QVLKIANVDTADTATYYCLYGYTYWGQGTTLVTVSAD

30 **67. UCHL-1 scFv (SSS-S)H WCH2 WCH3**
Nucleotide sequence:

gtgttaagctgcccgcataagttgctgttagctgtgtgctgatgtctggattcctgctccatcagtgatgttgatgacc
aaactccactctccctgctgtcagcttggagatcaggccctcactctctgagatctagtcagagcccttttaccagtaatggaac
35 acctatttaccattggtacctgcagagccaggccagctctccaaaactcctgatctacaactttccaacgattttctgggtccca
cagggttcagtgccagtggatcaggagcagattcactcaaatcagcagagtgaggagctgaggatctggaggtttattctgct
tcaaatgtacacatgttccgtggacgttcgtggagccaccaagctggaaatcaaatgagtgctggctcggcggtgggtgagct
ggagaggtgggagctctcagattactctgaagagctgtgcccctgggattctcagccctccagaccctcagctgtgactgttct
40 tctctgggtttcactgaccattatggtataggaggtggattcgtcagccctccagggagggctcggagtgctgacacacat
ttgtggaaatgataataagactataacacagccctgaggagccgctcacaatctccaaggattcctccaacaacaaagtaactct
caagatcgcacaaatgtggacactgcagataccgccacatactactgtctctacggctacacttactggggccaaaggagactctgt
ctgtctctcgtatcagggagccaaaacttctgacaaaactcacacatcccaccgtctcagaccctgaactcctgggtggaccgt
cagctctctctctcccccaaaaacccaggacaccctcatgatctccggacccttgagggtacatgctgggtgggagctgagc
45 caccgaagaccctgaggctcaagttcaactgtgactgtggacggcgtggaggtgcataatgccaaagacaaaggccggggaggagca
gtacaacagcagctaccgtgtgtgtcagcgtcctaccgtcctgaccaggagctggctgaatggcaggaagtacaaggtgcaaggtc
tccacaacaaagccctccagcccccacatcgagaaaacatctccaagaccagggcagcccccagagacacacagggtgtacacact
ggccccctccgggatgagctgaccacaagacaccaggtcagcctgacctgctgtgtcaaaaggctctatctcaagcgcacatcggctg
50 ggtggagagcgaatggcgagccggagaaacactacaagaccacgcctcccggtgctgagctcagcgtgaggtcctctctctac
agcaagctaccgtggagacaagcaggtggcagcagggagacgtcttctatgctccgtgatgcatgaggtctgcacacaccat
acacgcagagagagcctctccctgtctccgggttaaatgactaga

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PCT/US2003/041600

Amino acid sequence:

MKLPVRLVLMFWIPASISDVVMTQTPLSLPVS LGDQASISCRSSQSLLYSNGNTYL
HWY LQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHPVPTFGGGTKLEIKDGGSGGGSGGGSSQITLKESGPGILQPSQITSLTCS
5 FSGFSLTTYGIGVGWIRQPPGKGLEW LTHIWWNDNKYYNTALRSRLTISKDSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGLTVTVSADQEPKSSDKTHTSPSSAP
ELLGGPSVFLFPKPKD TLMISRTP EVT CVVVDVSHEDPEVKFNWYVDGVEVHNA
KTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQ
10 PREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPPV
L DSDGSFFLYSKLTVDKSRWQQGNV FSCSVMH EALHNHYTQKLSLSLSPGK

68. UCHL-1 scFv VHL11S (SSS-S)H WCH2 WCH3

Nucleotide sequence:

gtgttaaacctgccgccatgaagttgacctgttagctgtgttgctgctgattgttggattcctgcttcacatcagtgatgttgatgaccc
aaactccactctcctcctcgtcgtcgtcgtgagntcaggcctccatctcttcagatctagtcagagcctctttacagtaaggaac
acctattacattggtacactgcagaaagccaggccagctctcctcaaaactcctgacatcacaaacttccaacccgattttctgggtccccaga
caggttcagtgccagtgatgacaggacacattcacactcaagatcagcagagtgaggagtgatctggagttattttgtctc
20 tcaaaatcacatgcttcctggtgacgttcgggtggagccaccagctggaatcaaaagatggcggctgcggcggtgtggtggtatct
ggaggaggtggaggtcctcagattactctgaagagctctgcccctggagctccagcccctccagaccctcagctgactgtgtc
tttctgtggtttcactgaccacttatgtagagtagtggtgattcgtcagcctccagcagggaaggtctggaatgctgtgacacac
attgtgtgaatgataaataactataacacagccctgaggagcggcctcaaatctcaagatcttcacaaaccaagtaactc
ctcaagatcgccaatgtggacactgcagataccgccacatactactgtctctacggctacac(tactggcgcccaaggagactgtgtc
25 actctctctgtgacaggagcccaaatctctgacaaactcacacatccccaccgtccctcagcactggaactctgggtggagcg
tcagttctctctctcccccaaaacccaaggacacctatgatctccggaccctctaggctacatcgctgtgtggtgacgtgag
ccacgaagacctgaggtcgaagtcaactggtacgtgagcgctgagagtgcatatggccaagacaaagccggggagagc
agtacaacagcagctaccgtgtgtgacgctcctcaccgtctgaccagagctggtgaaatggcgaaggagtaacagtgcaaggt
ctcaacaagaagcctccagcccccagagaaacatctccaaagccaanaggcgagcccccagaccacaggtgtacaccc
30 tggcccccacccgggtagctgaccaagaaccaggtcagcctgacctgctgtcctcaaaagctctatccaaagcagatccgctg
ggagtgaggagacaaatggggagccggagaanaactacaagaccagcctccgctgctgacctccgagcctcctctctctctc
cagcaagctcaccgtggacaagagcaggtggcagcagggaacgtctctctatctctcgtatgatgaggtctgcacaacca
ctacacgagaaagagcctcctctgtctccgggtaagtgtatgaa

Amino acid sequence:

MKLPVRLVLMFWIPASISDVVMTQTPLSLPVS LGDQASISCRSSQSLLYSNGNTYL
HWY LQKPGQSPKLLIYKLSNRFSGVPDRFSGSGSGTDFTLKISRVEAEDLGVYFCS
QSTHPVPTFGGGTKLEIKDGGSGGGSGGGSSQITLKESGPGILQPSQITSLTCS
35 SFGFSLTTYGIGVGWIRQPPGKGLEW LTHIWWNDNKYYNTALRSRLTISKDSSNN
QVLLKIANVDTADTATYYCLYGYTYWGQGLTVTVSADQEPKSSDKTHTSPSSAP
ELLGGPSVFLFPKPKD TLMISRTP EVT CVVVDVSHEDPEVKFNWYVDGVEVHNA
KTKPREEQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIEKTISKAKGQ
40 PREPQVYTLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPENNYKTTTPPV
L DSDGSFFLYSKLTVDKSRWQQGNV FSCSVMH EALHNHYTQKLSLSLSPGK

69. 5B9 VH L11S

Nucleotide sequence:

gggagctctcagctgcagctgaagcagctcaggacctggctcagtcagctcctcacagagcctgtccatcaccctgcacagctctctg
gtttctattaactaacatgctgtacactgggttcgccagctccaggaaaggctctggagtggtctggagtgatagtgagtggtgg
50 aatccagactataatgagctttcatatccagactgagcaltaccagaggacgattccaagagcgaagtgtttttaaataagaacgtc

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tgcaacctaatgacacgcccatttattactgtgccagaatatgggggtgataactacccttattactatgctatggactactgggggtcaa
ggaaacctcagtcacccgtctctcag

Amino acid sequence:

(GSS)QVQLKQSGPVSQSSQSLSIITCTVSGFSLTTYAVHWVRQSPGKGLEWLGVI
WSGGITDYNAAFISRLSITKDDSKSQVFFKMNSLQPNDAITYYCARNGGDNYPPYY
YAMDYWGQGSTVTVSS

73. 5B9 VH L11S scFv

Nucleotide sequence:

aagcttgccgccatgagggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacgca
ggctgcattctccaatccagtcacictttggaaacatcagcttccatctctcaggtctgataagagcttctccatagtaagtgcacga
cttaillgtatlggtatctgcagaagccaggccagcttctcagctcctgattatcagatgtccaaacttgcctcaggagtcaccagaca
15 cagtcagtagcgtgggtgcaggaaactgatttcacacitgagaatcagcagagtgaggagctgaggatgfggggtgittattactgtgctc
aaatctcagaacttcgcctcagcttctggtgctgggaccangctggagctgaaacgggggtggcgggtgctcggggcgggtgggt
cgggtggcggcgggagctcaggtgcagctgaagcagtcagagacctggctcagtgicagctcctcagagagcctgtccatcaacct
gcacagtctctgtttctcattaaactaactatgctgtacactgggttcgccagctcaccagaaagggtcgtgagtggtcggagtgat
atggagtggtggaactcagactataatgcagctttcatalccagactgagcatcaccaggacgttccagagccaaagttttcttt
20 aaatgaacagctctgcaacctaatgacacgcccatttattactgtgccagaatatgggggtgataactacccttattactatgctatgga
ctactgggggtcaaggaaacctcagtcacccgtctctcag

Amino acid sequence:

ASQAQLGLLVLPWGSTADIVMTQAAFSNPVTLGTSASISCRSSKSLLSHNGITY
17MYWYLPKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLIRSRVIEADVGVYYC
25 AQNLEPLPFGAGTKLELRGGGGSGGGGSGGGSSQVQLKQSGPVSQSSQSLSI
TCTVSGFSLTTYAVHWVRQSPGKGLEWLGVIWSGGITDYNAAFISRLSITKDDSKS
QVFFKMNSLQPNDAITYYCARNGGDNYPPYYAMDYWGQGSTVTVSS

70. 5B9 scFv VH L11S (SSS)-II WCH2 WCH3

Nucleotide sequence:

aagcttgcgccatgaggttctctgctcagcttctggggctgcttgtgctctggatccctggatccactgcagatattgtgatgacga
ggctgcattctccaatccagtcacictttggaaacatcagcttccatctcctcaggtctgataagagcttctccatagtaagtgcacga
35 ctattttgattgtgctatctgcagaagccaggccagcttctcagctcctgattatcagatgtccaaacttgcctcaggagtcaccagaca
ggttcagtagcagtggtgcaggaaactgatttcacacitgagaatcagcagagtgagggtgaggatgfggggtgittattactgtgctc
aaatctcagaacttcgcctcagcttctggtgctgggaccangctggagctgaaacgggggtggcgggtgctcggggcgggtgggt
cgggtggcggcgggagctcaggtgcagctgaagcagtcaggacctgggtcagtgtagtctcagagagcctgtccatcaacct
gcacagtctctgtttctcattaaactaactatgctgtacactgggttcgcagctcaccagaaagggtcgtgagtggtcggngtgat
40 atggagtggtggnaactcagactataatgcagctttcatalccagactgagcatcaccaaaggacgattccaaagccaaagttttcttt
aaatgaacagctctgcaacctaatgacacagcccatttattactgtgccagaatatgggggtgataactaccccttattactatgctatgga
ctactgggggtcaaggaaacctcagcttctcctgacaggagcccaaatcttgcagaaactcaccacacccaccgctcctc
agcactcgaactcctgggtggaccgtcagcttctctctcccccaaaaacccaaaggacacctcatgctcctcgggacccctgagg
tcacatgcgtgtgtgtgacgtgagccacgaagacctgaggtcnaagttcaactgtgtacgtgagcggcgtggaggtgcataatgc
45 caagacaanaagccgcgggaggaagcagttacaacagcagctaccgtgtgtgtcagcgtctcaccgtctcggaccagagctgtgtga
atggcaaggaggtacaaagtccaaggtctccaaanaagccctccagcccccagagaaacacatctccaaaggcnaaggcag
ccccgagaaacacnagggttacacctgccccatccccggatgagctgacaaagacaaggctcagctgacctgctgtcctcaga
agctctcacaagcagactcgcctggtgagtggtggagagcaatggcgagccggagagaacaaactacaagaccacgctcccgctgct
ggtcctccagcggctcttctctctacagcaagctcaccgtggacaagagcagtggtgcagcaggggaacgttctctcatgctcc
50 gtgatgcatgaggtcgtcacaacactacagcagaaagacctcctctgctccgggtgaaatgatcatgag

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Amino acid sequence:

MRFSAQQLGLLVLPWPGSTADIVMTQAAFSNPVTLGTSTASISCRSSKSLLSHNSGITY
LYWYLQKPGQSPQLLIYQMSNLASGVPDRFSSSGSGTDFTLRISRVEAEDVGVYYC
AQNLELPLTFGAGTKLELKRGGGSGGGGSGGGGSSQVLKQSGPGSVQSSQSLSI
5 TCIVSGFSLTTYAVHWVRVQSPGKLEWLVGIWSGGITDYNAAFISRLSITKDDSKS
QVFFKMNSLQPNDAIYYCARNGGDNYPPYYAMDYWGQGTSTVTVSSDQEPKSS
DKHTSPSSAPELLGSPSVFLFPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNW
YVDGVVHNAAKTPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAP
PIEKTISKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQP
10 ENNYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLS
LSPGK

15 **76. 2H7 scFv VH L11S (SSS-S)H P238SCH2 WCH3**

Nucleotide sequence:

aagcttgccgccatggaatttcagtcagatttcagcttctgctaatacagtgcttcagcataattgccagaggacaaattgtctct
cccagctccagcaaatctgtctgcatctccaggaggagagcacaatgactgcaggccagcctcaagtgaattacatgcact
ggataccagcagaagccagatctccccaaacctgatttgcctccacacctgcttcaggatccctgctcgttcagtg
20 gcagtggtctgagaccttactctcacaatcagcagagtgaggctgaagatgctgccaattacttactgccagcagtgaggtt
taaccaccacagcttgcgtgctggaccagctggagctgaagatggcgggtgctcggcggtgtgtgagctgagagaggtg
ggagctctcaggttatctacagcagctgggctgagctgctggcctcagtggaagtgtcctgcagagcctctgctg
tacacattaccagttacaatatgacactgggtgaagcagacacagcagagggcctggaattgattgagctattatccaggaat
ggtgatactctcaaatcagaagttcaaggcgaaggccacactgactgtgacaaatctccagcagacgctacatgcagctcag
25 cagcctgcacatctgaagactctgggtctatttctgtgcaagagtgtgtactatagtaactcttactgtacttcgaigtctgtggcac
aggagaccaggtcaccgtctctctctgacaggagcccaaatctctgacaaaactcaacatccccaccgtctcagacactgaact
ctctgggggagctgctcagcttctcttcccccacaaagcagacacctcatgctctccggaccctgaggttcacatgggtgg
tggtgagctgagggcagcagaagccctgaggtcaagtcaactgtgacgtgagcgtggaggtgcataatgccagacaagc
30 cggcggaggagcagctacaacagcactgacctgtgtgtcagcgtctcaccgtctgacaccagcagctggtgaatggcgaaggag
tacaagtgcaagcttccacaagaagcctccagcccccacgagaaacatctccaaagcacaaggcagagcccccaggaacc
acaggtgtacacacctgcccccacccgggatgagctgaccaagaacaggctcagcctgacctgctgtcacaaggcttctatccc
agcgacatcgccgtgagtgaggagcaatggggcagccggagaacaactacaagaccagcctcccgtgctggactcagcag
gctctcttctctacagcaagctcaccgtggacagagcaggtggcagcagggagacactgtctctcatgctccgtgatgatgag
gctctgcacaaacctacacgacgaagaagcctctctctgctccgggttaaatgatcagta

35 Amino acid sequence:

MDFQVQIFSFLLISASVILARGQIVLSQSPAILASPGKEKVTMTCRASSVSVMHWY
QQKPGSSPKPWYAPSNLASGVPARFSGSGGTSYSLTISRVEAEDAATYYCQQWS
FNPPTFGAGTKLELKDGGGSGGGGSGGGGSSQAYLQSGAESVRPGASVKMSCK
40 ASGYTFTSYNMHWVKQTPRQGLEWIGAIYPNGNDTSYNQKFKGKATLTVDKSSS
TAYMQLSSLTSEDSAVYFCARVYYSSNYWYFDVWGTGTVTVTVSSDQEPKSSDK
DHTSPSSAPELLGSSSVFLFPKPKDITLMISRTPEVTCVVVDVSHEDPEVKFNWYV
DGVVHNAAKTPREBQYNSTYRVVSVLTVLHQDWLNGKEYKCKVSNKALPAPIE
KTISKAKGQPREPQVYITLPPSRDELTKNQVSLTCLVKGFYPSDIAVEWESNGQPN
45 NYKTTTPVLDSDGSFFLYSKLTVDKSRWQQGNVFCSCVMHEALHNHYTQKSLS
PGK

78. 2H7 scFv VH L11S (SSS-S)H WCH2 WCH3

Nucleotide sequence:

50 aagcttgccgccatggaatttcagtcagatttcagcttctgctaatacagtgcttcagcataattgccagagacaaattgtctct
cccagctccagcaaatctgtctgcatctccaggaggagagcacaatgactgcaggccagcctcaagtgaattacatgcact

PCT/US2003/041600

Amino acid sequence:

79. 2H7_{scFv} VH L11S (CSS-S)H WCH2 WCH3

Nucleotide sequence:

399